THAMES RIVER BASIN

ASHFORD, CONNECTICUT

ASHFORD LAKE DAM
CT 00462

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

AUGUST 1980

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

407-441

REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER: CT 00462	2. GOVT ACCESSION NO.: ADA144643
3. RECIPIENT'S CATALOG NUMBER:	
4. TITLE (and Subtitle): Ashford Lake Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS	5. TYPE OF REPORT & PERIOD COVERED: INSPECTION REPORT
	6. PERFORMING ORG. REPORT NUMBER:
7. AUTHOR(s): U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION	8. CONTRACT OR GRANT NUMBER(s):
9. PERFORMING ORGANIZATION NAME AND ADDRESS:	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS:
11. CONTROLLING OFFICE NAME AND ADDRESS: DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254	12. REPORT DATE: August 1980 13. NUMBER OF PAGES: 55
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office):	15. SECURITY CLASS. (of this report): UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE:

16. DISTRIBUTION STATEMENT (of this Report)

APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Thames River Basin
Ashford, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

he dam, consists of an earth embankment with a spillway at the right end and a low-level outlet at the central portion. The dam has a maximum impoundment capacity of 715 acre-feet and is approximately 450 feet long, 20 feet wide at the top and 26.5 feet in height above the streambed of the outlet discharge channel at the toe of the dam. Based on visual inspection at the site and past performance, the dam appears to be in fair condition. In accordance with the Corps of Engineers' guidelines, Ashford Lake Dam is classified as a high hazard, small size dam. The test flood range to be considered is from one-half the PMF to the PMF.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED

NOV 14 1980

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Ashford Lake Dam (CT-00462) Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Ashford Lake, Inc., Manchester, Conn.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

WILLIAM E. HODGSON, JR.
Colonel, Corps of Engineers
Acting Division Engineer

Incl
As stated

THAMES RIVER BASIN

ASHFORD, CONNECTICUT

ASHFORD LAKE DAM
CT 00462

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

AUGUST 1980

BRIEF ASSESSMENT

PHASE I INSPECTION REPORT

NATIONAL PROGRAM OF INSPECTION OF DAMS

Name of Dam:	ASHFORD LAKE DAM
Inventory Number:	CT 00462
State Located:	CONNECTICUT
County Located:	TOLLAND
Town Located:	ASHFORD
Stream:	GOSS BROOK
Owner:	ASHFORD LAKE INC.
Date of Inspection:	MARCH 31, 1980
Inspection Team:	PETER M. HEYNEN, P.E.
	MIRON PETROVSKY
	JAY A. COSTELLO
	MURALI ATLURU, P.E.

The dam, built in 1949, consists of an earth embankment with a spillway at the right end and a low-level outlet at the central portion. The dam has a maximum impoundment capacity of 715 acre-feet and is approximately 450 feet long, 20 feet wide at the top (elevation 667.8) and 26.5 feet in height above the streambed of the outlet discharge channel at the toe of the dam. The top of the dam is an unpaved road, the downstream slope is covered with brush and the upstream slope has dumped riprap to within 3± feet of the top with a growth of weeds on the remaining portion. The spillway is a 15± foot wide earth and gravel channel with 6± foot high concrete abutment walls, and is located at the right end of the dam. The outlet is located at the central portion of the dam, is gated upstream, and has a rectangular outlet measuring 2.0 feet by 1.5 feet, downstream invert elevation 641.3.

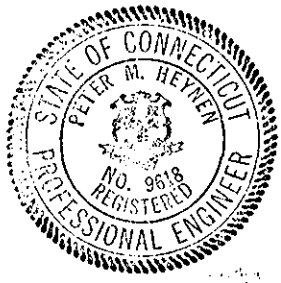
Based upon the visual inspection at the site and past performance, the dam appears to be in fair condition. There are signs of settlement of the concrete gate structure and extensive cracking and horizontal movement at the spillway concrete abutment walls. There are also areas requiring maintenance and monitoring such as seepage at the toe of the dam, erosion of the upstream slope above the riprap, potholes and ruts in the top of the dam and depression area on the downstream slope.

In accordance with the Corps of Engineers' guidelines, Ashford Lake Dam is classified as a high hazard, small size dam. The test flood range to be considered is from one-half the Probable Maximum Flood (½ PMF) to the Probable Maximum Flood (PMF). The test flood for Ashford Lake Dam is considered to be equivalent to the ½ PMF. Peak inflow to the lake at the test flood is 400 cubic feet per second (cfs) and peak outflow is 120 cfs with freeboard to the top of the dam of 4.4 feet. The spillway capacity with the lake level to the top of the dam is 650 cfs, which is greater than 100% of the routed test flood outflow.

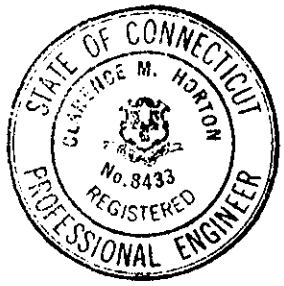
It is recommended that the owner retain the services of a registered professional engineer qualified in dam design and inspection to perform further studies as presented in Section 7.2. These include repair of the concrete abutment walls at the spillway channel, evaluation of the condition of the outlet pipe, the origin and significance of seepage at the toe of the dam as well as the depression at the central portion of the downstream slope. Recommendations should be made by the engineer and implemented by the owner.

The above recommendations and further remedial measures which are discussed in Section 7, should be instituted within 1 (one) year of the owner's receipt of this report.

Peter M. Heynen, P.E.
Project Manager - Geotechnical
Cahn Engineers, Inc.



C. Michael Horton, P.E.
Department Head
Cahn Engineers, Inc.



This Phase I Inspection Report on Ashford Lake Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

RICHARD DIBUONO, CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspection. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam would necessarily represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions will be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions there of. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as neccessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

The information contained in this report is based on the limited investigation described above and is not warranted to indicate the actual condition of the dam. The integrity of the dam can only be determined by a means of a monitoring program and/or a detailed physical investigation. The accuracy of available data is assumed where not in obvious conflict with facts observable during the visual inspection.

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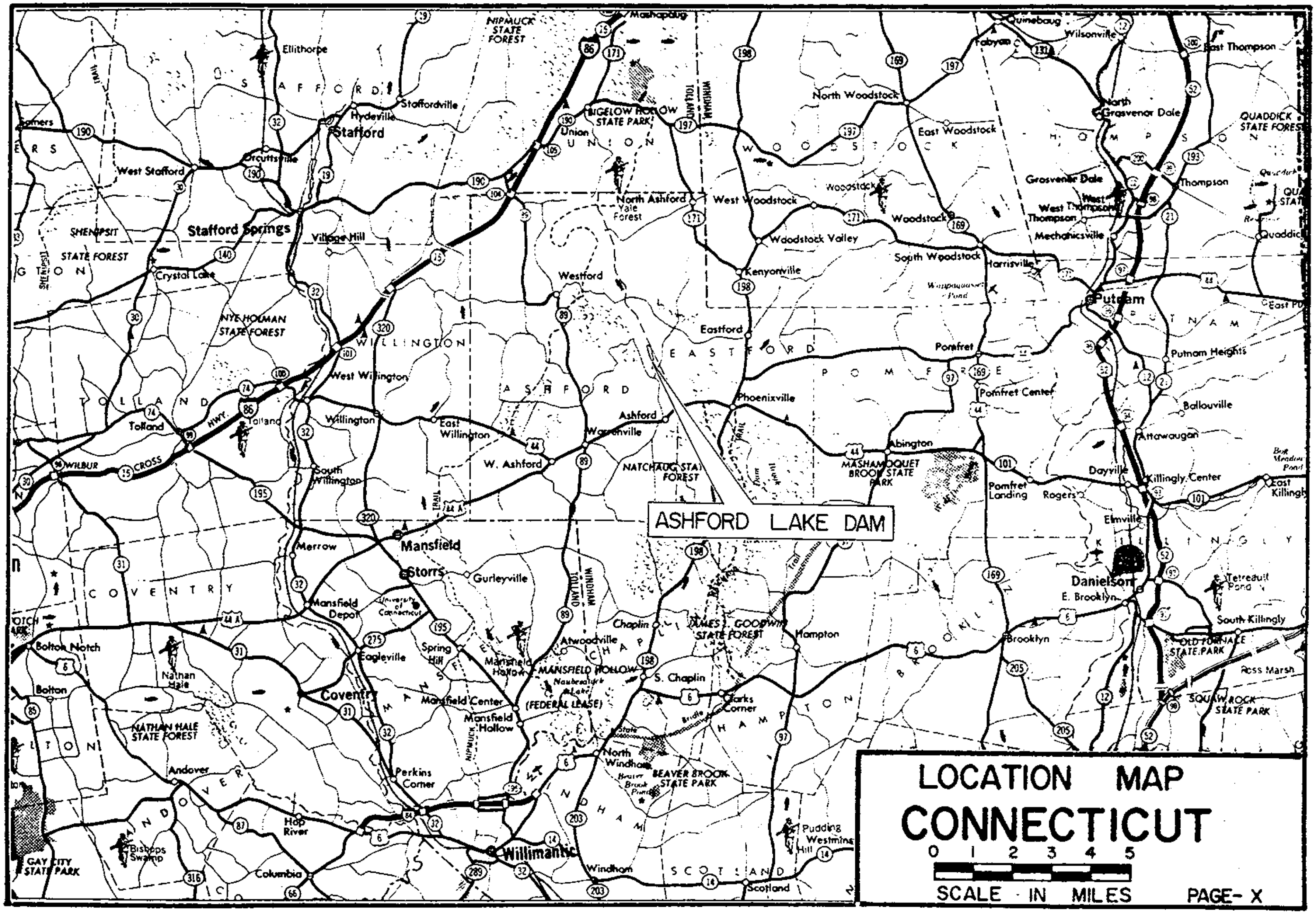
APPENDICES

OVERVIEW PHOTO
March 1980

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Ashford Lake Dam	Ashford	DATE Aug. 1980
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED DAMS	Goss Brook	CONNECTICUT	CE # 27785 KD PAGE ix


ASHFORD LAKE DAM
LOCATION MAP
CONNECTICUT
0 1 2 3 4 5
SCALE IN MILES
PAGE- X
NIPMUCK STATE FOREST
Mashapaug
Ellithorpe
Staffordville
Hydeville
Stafford
Somers
West Stafford
Orcuttsville
Stafford Springs
SHENIPSIT STATE FOREST
Crystal Lake
Village Hill
NYE-HOLMAN STATE FOREST
WILLINGTON
West Willington
Willington
Tolland
WILBUR CROSS HWY.
East Willington
W. Ashford
South Willington
Mansfield
Storrs
Gurleyville
Merrow
COVENTRY
Mansfield Depot
University of Connecticut
Bolton Notch
Bolton
Nathan Hale
Eagleville
Spring Hill
Mansfield Hollow
Coventry
Mansfield Center
NATHAN HALE STATE FOREST
Andover
Perkins Corner
Hop River
Bissops Swamp
GAY CITY STATE PARK
Columbia
Willimantic
BIGELOW HOLLOW STATE PARK
Union
North Ashford
Yale Forest
Westford
Eastford
ASHFORD
Ashford
Warrenville
NATCHAUG STATE FOREST
Phoenixville
Chaplin
JAMES L. GOODWIN STATE FOREST
Atwoodville
MANSFIELD HOLLOW
(FEDERAL LEASE)
S. Chaplin
Clarks Corner
Hampton
North Windham
BEAVER BROOK STATE PARK
Windham
SCOTLAND
Scotland
Pudding Hill
Westminster
North Woodstock
East Woodstock
West Woodstock
Woodstock
Woodstock Valley
Kenyonville
South Woodstock
Pomfret
Pomfret Center
Abington
MASHAMOQUET BROOK STATE PARK
Pomfret Landing
Rogers
Brooklyn
Quinebaug
Wilsonville
Fabyan
East Thompson
North Grosvenor Dale
Grosvenor Dale
West Thompson
Thompson
QUADDICK STATE FOREST
Mechanicsville
Harrisville
Putnam
PUTNAM
Putnam Heights
Ballouville
Attawaugan
Dayville
Killingly Center
East Killingly
Elmville
Danielson
E. Brooklyn
South Killingly
OLD FURNACE STATE PARK
Ross Marsh
SQUAW ROCK STATE PARK

PHASE I INSPECTION REPORT

ASHFORD LAKE DAM

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority - Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Cahn Engineers, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Cahn Engineers, Inc. under a letter of April 14, 1980 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW 33-80-C-0052 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection Program - The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.

2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dam.

3. To update, verify and complete the National Inventory of Dams.

c. Scope of Inspection Program - The scope of this Phase I inspection report includes:

1. Gathering, reviewing and presenting all available data as can be obtained from the owners, previous owners, the state and other associated parties.

2. A field inspection of the facility detailing the visual condition of the dam, embankments and appurtenant structures.

3. Computations concerning the hydraulics and hydrology of the facility and its relationship to the calculated flood through the existing spillway.

4. An assessment of the condition of the facility and corrective measures required.

It should be noted that this report passes judgment only on those factors of safety and stability which can be determined by a visual surface examination. The inspection is to identify those visually apparent features of the dam which evidence the need for corrective action and/or further study and investigation.

1.2 DESCRIPTION OF PROJECT

a. Location - The dam is located on Goss Brook (Thames River Basin) in a rural area of the town of Ashford, County of Tolland, State of Connecticut. The dam is shown on the Westford USGS Quadrangle Map having coordinates latitude N 41° 53.8' and longitude W 72° 07.7'.

b. Description of Dam and Appurtenances - The dam is an earth embankment with an unlined spillway channel and a low-level outlet. The embankment is approximately 450 feet long including the spillway, and is 26.5 feet in height above the outlet channel at the toe of the dam. The top of the dam is 20 feet wide, 6.3 feet above the spillway channel, slightly irregular (elevation of 667.8) and supports an unpaved road as wide as the top of the dam. The upstream slope is inclined at about 2 horizontal to 1 vertical above the water line, and has a 3 foot weed covered strip between the dumped riprap protection and the top of the dam. The downstream slope has an inclination of 2.5 horizontal to 1 vertical at the outlet headwall and a brush and weed cover.

The spillway is a 15 foot wide gravel and earth lined channel with 6+ foot high concrete abutment walls at either side. A concrete slab bridge spans the spillway and allows a clearance of about 5 feet between the low chord of the bridge and the channel floor (See Sheet B-1, Photo 4). A narrow-crested concrete weir (crest elevation 661.5) extends across the channel directly under the bridge. There are several small mounds of earth along the discharge channel approximately 100 feet downstream from the spillway. These seem to have been built to channel the spillway outflow away from the toe of the dam.

A 4 foot by 4 foot concrete gate structure for the low-level outlet is located about 150 feet from the left abutment and houses the hand operated valve stem for opening the outlet. A concrete headwall outlet structure is located at the toe of the dam. There is a 2.0 foot wide by 1.5 foot rectangular opening in the headwall with invert elevation 641.3 (See Sheet B-1). The exact type, size, location and length of the outlet pipe and inlet structure could not be determined at the time of the inspection. However, the original owner reported that there is a 16 inch cast iron pipe to a 16 inch gate valve, and a 16 inch concrete pipe from just below the valve to the outlet.

c. Size Classification - (SMALL) - The dam impounds 715 acre-feet of water with the lake level at the top of the dam, which at elevation 667.8, is 26.5 feet above the (old) streambed. According to the Army Corps of Engineers' "Recommended Guidelines", a dam with this height and storage capacity is classified as small in size.

d. Hazard Classification - (HIGH) - If the dam were breached, there would be potential for loss of more than a few lives and extensive property damage at a recreational facility 10,000± feet downstream, on Goss Pond. The rapid rise in water level at Goss Pond would inundate a beach and boat launching areas by some 8± feet and a site for campfires by less than 2± feet. The dam at Goss Pond would be overtopped by approximately 4 feet upon failure of Ashford Lake Dam. This overtopping of Goss Pond Dam would inundate a boy scout camping area and rifle range, which are used continuously throughout the spring and summer months, by 8.6± feet. A cub scout recreational facility (day time use only), which will also be in danger of severe flooding from water released over the spillway and over the dam at Goss Pond, is located 1600± feet downstream from Goss Pond Dam. Due to the extensive recreational use of these downstream facilities, Ashford Lake Dam is classified as a high hazard dam.

e. Ownership - Ashford Lake, Inc.
Mr. Harold W. Garrity, President
Garrity, Walsh, Diana, and Wichman
Attorneys at Law
753 North Main Street,
Manchester, Conn.
Tel: (203)-643-2181

The dam was originally owned and built by Joseph Campert of Woodstock, Connecticut. He sold the dam before completion to Ashford Lake Inc., who constructed the spillway and raised the dam to its present configuration.

f. Operator - Owner (see Ownership, above)

g. Purpose of Dam - Recreation.

h. Design and Construction History - The following information is believed to be accurate based on the available plans and correspondence and on conversations with the original owner, Mr. Joseph Campert. The dam was designed by Stanley Allen of Danielson and partially constructed by the original owner, Joseph Campert, who sold the property to Ashford Lake, Inc. in 1949. At this time the dam was completed to the elevation of the spillway. After purchase of the property, Ashford Lake Inc. cleared the lake area, constructed the spillway channel and raised the dam to its present elevation.

i. Normal Operational Procedures - No formal program of operation is known to exist. The gate valve is normally kept in a closed position and no lake level reading are taken.

1.3 PERTINENT DATA

a. Drainage Area - 0.36 square miles of rolling, wooded terrain located in the Thames River Basin and developed only along the close proximity of the lake.

b. Discharge at Damsite - Discharge is through the spillway channel and through the low-level outlet.

1. Outlet Works (conduits):	
2'x1.5' low-level outlet @ d/s invert el. 641.3	74 cfs (pond level at top of dam)
2. Maximum flood at damsite:	Unknown
3. Ungated spillway capacity @ top of dam el. 667.8:	650 cfs
4. Ungated spillway capacity @ test flood el. 663.4:	120 cfs
5. Gated spillway capacity @ normal pool el. 662.0:	N/A.
6. Gated spillway capacity @ test flood el:	N/A
7. Total spillway capacity @ test flood el. 663.4:	120 cfs
8. Total project discharge @ test flood el. 663.4:	120 cfs

c. Elevations - (NGVD: based on assumed datum, See Sheet B-1)

1. Streambed at toe of dam:	641.3 (at outlet)
2. Maximum tailwater:	N/A
3. Upstream portal invert diversion tunnel:	N/A
4. Normal pool:	661.5
5. Full flood control pool:	N/A
6. Spillway crest (ungated):	661.5
7. Design surcharge:	Unknown
8. Top of dam:	667.8
9. Test flood surcharge:	663.4

d. Reservoir (Length in feet)

1. Normal pool:	3000 ft.
2. Flood control pool:	N/A
3. Spillway crest pool:	3000 ft.
4. Test flood pool:	3000 ft.
5. Top of dam:	3200 ft.

e. Storage (acre-feet)

1. Normal pool:	370 acre-feet
2. Flood control pool:	N/A
3. Spillway crest pool:	325 acre-feet
4. Test flood pool:	450 acre-feet
5. Top of dam:	715 acre-feet

f. Reservoir Surface

1. Normal pool:	51 acres
2. Flood control pool:	N/A
3. Spillway crest:	48.5 acres
4. Test flood pool:	56 acres
5. Top of dam:	71 acres

g. Dam

1. Type:	Earth Embankment
2. Length:	450 ft.
3. Height:	26.5 ft.
4. Top width:	20 ft.
5. Side slopes:	2H to 1V Upstream (above water line) 2.5H to 1V Downstream
6. Zoning:	N/A

7. Impervious Core:	N/A
8. Cutoff:	N/A
9. Grout curtain:	N/A
10. Other:	N/A

h. Diversion and Regulatory Tunnel - N/A

i. Spillway

1. Type:	Gravel and earth lined rectangular channel with concrete abutment walls and narrow-crested weir
2. Length of weir:	15 ft.
3. Crest elevation:	661.5
4. Gates:	N/A
5. U/S Channel:	Natural lake bottom
6. D/S Channel:	Streambed
7. General:	5 feet clearance from centerline channel to low chord of bridge

j. Regulating Outlets

1. Invert:	641.3 (d/s)
2. Size:	16 inch
3. Description:	Cast iron to gate valve, concrete to outlet structure
4. Control Mechanism:	16 inch cast iron valve with hand operated valve stem in concrete gate structure on upstream slope
5. Other:	2.0' wide by 1.5' opening in concrete headwall at toe of dam.

SECTION 2: ENGINEERING DATA

2.1 DESIGN DATA

The available data consists of an inventory data sheet from the Connecticut Department of Environmental Protection, and an inspection report by Charles Pelletier, in February 1979, which is also available from the State of Connecticut. The inspection report includes seepage observed at the outlet pipe, the condition of the spillway and recommends monitoring of the seep. The inspection report and inventory data sheets indicate the design features stated previously. There are no engineering values, assumptions, test results or calculations available for the original construction of the dam or subsequent spillway construction and raising of the dam.

2.2 CONSTRUCTION DATA

No information is available for construction of the dam as done by the original owner or the present owner.

2.3 OPERATION DATA

Lake level readings are not taken at the dam nor is the lake level altered other than from normal flows. The owner reports that the spillway capacity has never been exceeded. No formal operation records are known to exist.

2.4 EVALUATION OF DATA

a. Availability - Existing data was provided by the Connecticut Department of Environmental Protection, Water Resources Unit. The owner made the project available for visual inspection.

b. Adequacy - The limited amount of detailed engineering data available was generally inadequate to perform an in-depth assessment of the dam, therefore, the assessment of this dam must be based on visual inspection, performance history, hydraulic computations of spillway capacity and approximate hydrologic judgements.

c. Validity - A comparison of record data and visual observations reveals no significant discrepancies in the record data.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General - Based upon the visual inspection performed on March 31, 1980, the overall condition of the project appears to be fair. The inspection revealed items requiring repair, maintenance and monitoring. The reservoir level was at elevation 662.0 at the time of the inspection. The valve chamber and valve for the low-level outlet could not be observed at the time of the inspection.

b. Dam

Crest - The top of the dam showed no signs of misalignment or visible cracking. However, there is an unpaved, two lane road which extends the length of the dam. This road had a number of pot holes and ruts (Photo 2).

Upstream Slope - The upstream slope has dumped riprap to within 3± feet of the crest. The strip between the riprap and the top of the dam is covered with weeds and brush, and has several areas eroded by trespassing (Photo 1). Several areas along the water had missing riprap, causing this part of the slope to be quite irregular (Photo 1).

Downstream Slope - The downstream slope shows no signs of misalignment or sloughing. The entire slope is covered with weeds and brush (Photo 3). A seep of 2-3 gpm was observed at the left side of the toe of the dam. Water from this seep was clear. A small depression was noted approximately 6 feet below the top of the slope, 15± feet right from the outlet headwall. This depression is approximately 6 feet long and 1 foot deep.

Spillway - The spillway is an unlined channel with a narrow-crested concrete weir. The left and right concrete abutment walls had several large cracks with horizontal displacement (toward channel) along these cracks (Photo 6). A log and some wood debris was observed in the approach channel (Photo 4). The discharge channel had some small overhanging trees and a small earth dike on each side of the channel just downstream from the dam.

c. Appurtenant Structures - The concrete valve chamber for the low-level outlet had some spalling on the top surface and showed signs of settlement at the upstream side; however, no sign of cracking was observed on the exterior surface. The interior walls could not be inspected. The size, type and length of the outlet conduit could not be observed. The outlet headwall had no spalling and appeared to be in good condition (Photo 5). A flow of 4-6 gpm was observed coming from the outlet in the headwall. The dry-laid retaining wall at the right side of the outlet channel is in poor condition. The outlet channel itself is fairly wide and is filled with some debris and brush. The channel is also filled with orange-brown deposits, which seriously restrict flow from the outlet (Photo 5).

d. Reservoir Area - The area surrounding the lake is wooded, rolling and was lightly developed along the waterfront.

e. Downstream Channel - The downstream channel for the dam is wooded and undeveloped to the impact area. There are two dams in this channel; one at Sabo Pond about 2700 feet downstream and one at Goss Pond about 10,700 feet downstream. The dam at Sabo Pond is an old dry-laid masonry and earth structure about 12 feet high and 50 feet long. Goss Pond Dam is a large earth embankment approximately 650 feet in length and 28 feet in height.

3.2 EVALUATION

Based upon the visual inspection the project is assessed as being in fair condition. The following features which could influence the future condition and/or stability of the dam were identified.

1. Cracking and horizontal movement of the spillway channel concrete abutment walls.

2. Seepage at the left end of the toe of the dam.

3. Erosion and lack of proper slope protection on the upstream slope of the embankment.

4. Depression area on downstream slope.

5. Lack of proper protection for top of dam.

6. Outlet seriously restricted by sedimentation.

SECTION 4: OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES

a. General - There are no formal procedures for regulation of flows or lake levels. The only gated outlet is the low-level outlet at the center of the dam.

b. Description of any Formal Warning System in Effect -No formal warning system is in effect.

4.2 MAINTENANCE PROCEDURES

a. General - No formal program for maintenance of the dam is in existence. The owner reports that cutting of the brush on the dam slopes and filling of ruts in the road across the crest is performed as needed.

b. Operating Facilities - No formal program for maintenance of the low-level outlet is in existence.

4.3 EVALUATION

The operation and maintenance procedures are generally poor and require improvement. A formal program of operation and maintenance procedures should be implemented by the owner, including documentation to provide complete records for future reference. Also, an emergency action plan and formal warning system should be developed and implemented within the time period indicated in Section 7.2c. Remedial operation and maintenance recommendations are presented in Section 7.

SECTION 5: EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 GENERAL

The watershed is 0.36 square miles of densely wooded rolling terrain located in the Thames River Basin with light residential development along the lake. Approximately, 25% of the watershed area consists of flat land and lake surface. The spillway is an unlined channel with concrete side walls and has no gate. The low-level outlet is gated at the upstream end.

The maximum possible storage to the top of dam (El. 667.8) is estimated to be 715 acre-feet. The Ashford Lake Dam is classified as small in size and has a hazard classification of high.

5.2 DESIGN DATA

No hydraulic or hydrologic design data or computations could be found for the original construction.

5.3 EXPERIENCE DATA

No information on serious problem situations arising at the dam was found, and the maximum discharge at this dam is unknown.

5.4 TEST FLOOD ANALYSIS

Based upon the Army Corps of Engineers' "Preliminary Guidance for Estimating Maximum Probable Discharges", dated March 1978, the watershed classification (rolling), and a watershed area of 0.36 square miles, a PMF of 800 cfs, or 2220 cfs per square mile, is estimated at the dam site. The dam is classified as a small size, high hazard dam. Therefore, the test flood range to be considered is from the ½ PMF to the PMF. Due to the limited use of the recreational facility at the initial impact area a test flood of ½ PMF is selected for Ashford Lake Dam.

The peak inflow at the ½ PMF is determined to be 400 cfs, and the peak outflow is estimated to be 120 cfs (maximum pool elevation at 663.4) with a freeboard to the top of the dam of 4.4 feet. The spillway capacity with the pool to the top of the dam (elevation 667.8) is estimated to be 650 cfs, which is greater than 100% of the routed test flood outflow.

5.5 DAM FAILURE ANALYSIS

The impact at downstream areas upon failure of the Ashford Lake dam was assessed using the "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", issued by the Army Corps of Engineers. The peak outflow before failure of the dam would be about 120 cfs and peak failure outflow from the dam breaching is estimated to be 13,300 cfs; resulting in a failure flood depth of 10± feet just below the dam and a loss of more than a few lives at the initial impact area.

The estimated failure outflow would result in a rise of 4 feet in the water level at Sabo Pond, which would overtop a small stone dam and cause minor damage to a portion of North Street located 2600± feet downstream of Ashford Lake dam. Some 10,000 feet downstream from Ashford Lake Dam, the pool elevation in Goss Pond is expected to rise 8.6 feet, activating the emergency spillway and overtopping the Goss Pond dam by 4 feet. This rapid rise in the lake level at Goss Pond will inundate a beach area, boat launching areas and portions of a campfire site at a Boy Scout recreational facility. Water overtopping Goss Pond Dam and flowing through the emergency spillway will inundate a campsite and rifle range below the dam. Discharge through this area is estimated to be 6100 cfs, causing inundation of up to 8.6 feet of water. Additionally, the Cub Scout activity site 1600± feet below the Goss Pond Dam could also be impacted due to dam failure (See Appendix D-21 and Sheet D-1). This area, which is 7+ feet above the streambed, is expected to be inundated by 1+ feet of water upon failure of Ashford Lake Dam.

As well as increasing the water level in the stream below Goss Pond Dam, overtopping of this embankment will also sharply increase the possibility for failure of the dam, increasing the potential for loss of life and economic loss further downstream.

SECTION 6: EVALUATION OF STRUCTURAL STABILITY

6.1 VISUAL OBSERVATIONS

The dam has a cross-section with an upstream slope of 2 horizontal to 1 vertical, width at top of 20 feet and a downstream slope of 2.5 horizontal to 1 vertical. There is no evidence of toe drains or other methods of seepage control. There are areas of the project which require repair, maintenance and monitoring. These include seepage at the toe of the dam, riprap repair, lack of proper crest and upstream slope protection, and cracking and movement of the concrete abutments at the spillway channel. For recommendations, see Section 7.

6.2 DESIGN AND CONSTRUCTION DATA

There is not sufficient design and construction data available to permit an in-depth assessment of the structural stability of the dam.

6.3 POST CONSTRUCTION CHANGES

According to the owner, the following changes were made to the original construction after 1949:

1. Construction of the spillway channel.
2. Riprap placed on upstream slope.
3. Embankment raised to elevation of spillway abutments.

6.4 SEISMIC STABILITY

The dam is in Seismic Zone 1 and according to the Army Corps of Engineers' "Recommended Guidelines", need not be evaluated for seismic stability.

SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 PROJECT ASSESSMENT

a. Condition - Based upon the visual inspection of the site and past performance, the project appears to be in fair condition, with items which require maintenance, repair and monitoring.

Based upon the Army Corps of Engineers' "Preliminary Guidance for Estimating Maximum Probable Discharges", dated March 1978, and hydraulic/hydrologic computations, peak test flood inflow to the lake is 400 cfs and peak outflow is 120 cfs with freeboard to the top of the dam of 4.4 feet. The spillway capacity with the water level to the top of the dam is 650 cfs, which is greater than 100% of the routed test flood outflow.

b. Adequacy of Information - The information available is such that assessment of the condition and stability of the project must be based solely on visual inspection, past performance and sound engineering judgement.

c. Urgency - It is recommended that the measures presented in Section 7.2 and 7.3 be implemented within 1 (one) year of the owner's receipt of this report.

7.2 RECOMMENDATIONS

It is recommended that further investigation be made by a registered professional engineer qualified in dam design and inspection pertaining to the following items. Recommendations should be made by the engineer and implemented by the owner.

1. Repair of the concrete abutment walls at the spillway (Photo 6).

2. The significance of the depression area on the downstream slope in the central portion of the embankment and settlement of the valve chamber on the upstream slope.

3. Origin and significance of seepage at the toe of the dam near the outlet channel and at the left abutment. Development of a program to reduce or stop seepage through the embankment, if required.

4. Further inspection to determine the condition of the upstream gate valve and inside of the valve chamber.

5. Further inspection to determine the condition of the low-level outlet. This can be done by closing the valve at the upstream end and observing the outlet for seepage.

6. Development of a program for monitoring of seepage through the embankment and low-level outlet if measures to stop seepage are not required.

7.3 REMEDIAL MEASURES

a. Operation and Maintenance Procedures - The following measures should be undertaken by the owner within the time period indicated in Section 7.1.c, and continued on a regular basis:

1. Round-the-clock surveillance should be provided during periods of heavy precipitation or high project discharge. The owner should develop and implement an emergency action plan and downstream warning system in case of emergencies at the dam.

2. A formal program of operation and maintenance procedures should be instituted and fully documented to provide accurate records for future reference. This should include removal of all brush and small trees from the embankment, greasing and operating outlets at least once a year and removing all debris from the spillway and discharge channels.

3. A comprehensive program of inspection by a registered professional engineer qualified in dam inspection should be instituted on a biennial basis.

4. Eroded upstream slope of the embankment should be graded and riprap protection placed to well above the water line.

5. The road on the top of the dam should be regraded and proper protection placed.

6. The spalled concrete of the valve chamber should be repaired.

7. All obstacles, debris, or overhanging trees and brush on the spillway crest, and the floor of the spillway approach, discharge and low-level outlet channels should be removed. The damaged earth dikes along the spillway discharge channel should be restored to prevent spillway discharge along the toe of the dam.

8. The gate valve for the low-level outlet should be opened at least once a year to check its condition and to flush the outlet pipe. The valve should also be greased at this time.

9. The cutting of grass, brush and trees on the top, slopes and at the toe of the embankment should be continued as part of the routine maintenance procedures.

10. A program for periodic inspection by the owner or owner representative should be developed.

7.4 ALTERNATIVES

This study has identified no practical alternatives to the above recommendations.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Ashford Lake Dam DATE: March 31, 1980

TIME: 10:30 AM - 12:30 PM

WEATHER: Sunny - 60°F

W.S. ELEV. 662.0 U.S. ____ DN.S

PARTY:	INITIALS:	DISCIPLINE:
1. Peter M. Heynen	PMH	Geotechnical
2. Miron Petrovsky	MP	Geotechnical
3. Murali Atluru	MA	Hydraulic/Hydrologic
4. Jay A. Costello	JAC	Geotechnical
5. Tim Kavanaugh	TK	Survey
6.		

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Earth Embankment	PMH, MP, MA, JAC, TK	
2.	Spillway Channel	PMH, MP, MA, JAC	
3.	Outlet Structure	PMH, MP, JAC	
4.	Gate Structure	PMH, MP, JAC	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

PERIODIC INSPECTION CHECK LIST

PROJECT Ashford Lake Dam DATE March 31, 1980

PROJECT FEATURE Earth Embankment BY PMH, MP, MA, JAC, TK

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	667.8
Current Pool Elevation	662.0
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed
Pavement Condition	N/A
Movement or Settlement of Crest	None observed
Lateral Movement	
Vertical Alignment	Appears good
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	Cracking movement at spillway abutments
Indications of Movement of Structural Items on Slopes	Some settlement of gate structure
Trespassing on Slopes	Yes
Sloughing or Erosion of Slopes or Abutments	Erosion, sloughing u/s slope 1' depression d/s slope
Rock Slope Protection-Riprap Failures	some displacement
Unusual Movement or Cracking at or Near Toes	None observed
Unusual Embankment or Downstream Seepage	Some at toe
Piping or Boils	None observed
Foundation Drainage Features	
Toe Drains	
Instrumentation System	

PERIODIC INSPECTION CHECK LIST

PROJECT Ashford Lake Dam DATE March 31, 1980

PROJECT FEATURE Spillway Channel BY PMH, MF, MA, JAC

AREA EVALUATED	CONDITION
OUTLET WORKS-SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a) Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	
Floor of Approach Channel	Gravel and stone fill. Log across, wood debris
b) Weir and Training Walls	
General Condition of Concrete	Poor - 2" cracks, horizontal movement
Rust or Staining	None observed
Spalling	Some
Any Visible Reinforcing	None observed
Any Seepage of Efflorescence	
Drain Holes	N/A
c) Discharge Channel	
General Condition	Good
Loose Rock Overhanging Channel	None observed
Trees Overhanging Channel	Some small trees
Floor of Channel	Stone and gravel
Other Obstructions	None observed

PERIODIC INSPECTION CHECK LIST

PROJECT Ashford Lake Dam DATE March 31 1980

PROJECT FEATURE Outlet Structure BY PMH, MP, JWC

AREA EVALUATED	CONDITION
OUTLET WORKS-OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Good
Rust or Staining	Some
Spalling	None observed
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	N/A
Drain Holes	N/A
Channel	
Loose Rock or Trees Overhanging Channel	Some trees
Condition of Discharge Channel	Logs, brush, debris in channel. Right dry-laid stone wall in poor condition.

PERIODIC INSPECTION CHECK LIST

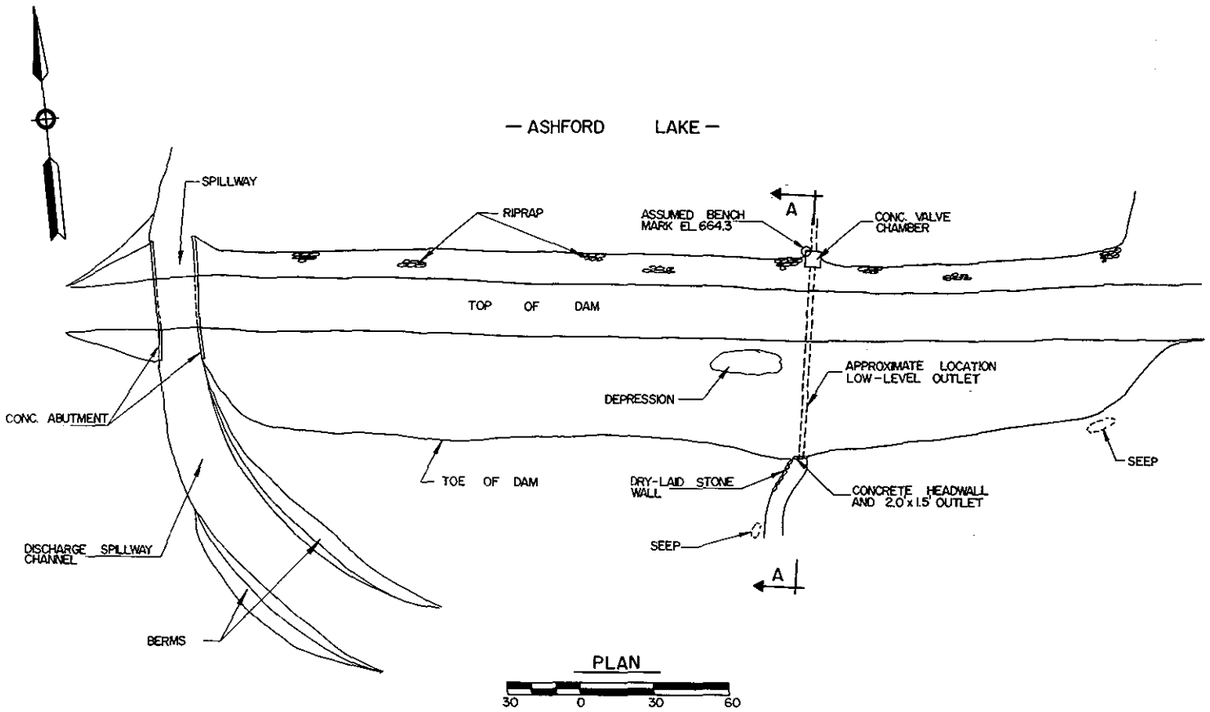
PROJECT Ashford Lake Dam DATE March 31, 1980

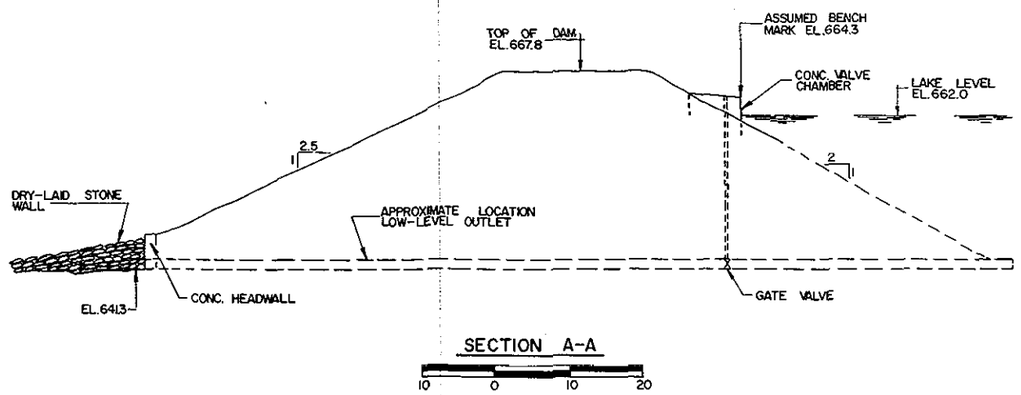
PROJECT FEATURE Gate Structure BY DMH, MP, JAC

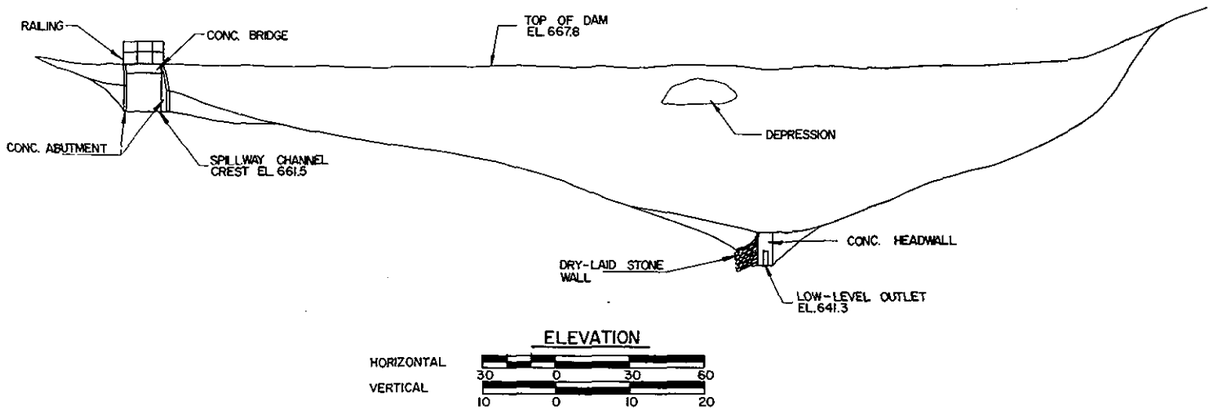
AREA EVALUATED	CONDITION
OUTLET WORKS-CONTROL TOWER	
a) Concrete and Structural	
General Condition	Good
Condition of Joints	Good
Spalling	Yes - on top
Visible Reinforcing	None observed
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	Good
Unusual Seepage or Leaks in Gate Chamber	Not observed
Cracks	None observed
Rusting or Corrosion of Steel	N/A
b) Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	N/A
Elevator	
Hydraulic System	
Service Gates	Appers good - some seepage although assumed closed
Emergency Gates	
Lightning Protection System	N/A
Emergency Power System	
Wiring and Lighting System	

APPENDIX B

ENGINEERING DATA AND CORRESPONDENCE







NOTES:

1. THIS PLAN WAS COMPILED FROM A CAHN ENGINEERS INSPECTION OF THE DAM DATED APRIL 22, 1980. DIMENSIONS SHOWN ARE APPROXIMATE. NOT ALL TOPOGRAPHIC AND/OR STRUCTURAL FEATURES ARE NECESSARILY IDENTIFIED.

2. ALL ELEVATIONS ARE N.G.V.D. AS TAKEN FROM AN ASSUMED DATUM. THE REFERENCED BENCH MARK FOR THIS PLAN IS THE TOP NORTHWEST CORNER OF THE CONCRETE VALVE CHAMBER ON THE UPSTREAM SLOPE. THIS BENCH MARK WAS ESTABLISHED USING THE LAKE LEVEL ELEVATION OF 662.0 GIVEN ON THE WESTFORD U.S.G.S QUADRANGLE MAP, DATED 1952 (P.R. 1970).

B.M.(664.3)=LAKE LEVEL EL. WESTFORD QUAD. (662.0)+2.3

CAHN ENGINEERS INC. WALLINGFORD, CONNECTICUT ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

ASHFORD LAKE DAM

GOSS BROOK ASHFORD, CONNECTICUT

DRAWN BY	CHECKED BY	APPROVED BY	SCALE: AS NOTED	
H. Leaman	JAC	AMH	DATE: AUGUST 1980	SHEET B-1

ASHFORD LAKE DAM

EXISTING PLANS

None Available

SUMMARY OF DATA AND CORRESPONDENCE

1

CT-462

STATE BOARD FOR THE SUPERVISION OF DAMS
INVENTORY DATA

Name of Dam or Pond ? Ashford Lake

Code No. MH 9.7 GS 3.4

Location of Structure

Town Ashford — Lat. 41°-53'-47" N

Name of Stream Goss Brook — Long. 72°-07'-40" W

U.S.G.S. Quad. Westford

Owner ~~Joseph Gompert~~ ASHFORD LAKE INC.

Address ATTN: GARRITY, DION & WALSH – ATTORNEYS

753 Main St.

MANCHESTER — 02/6/73

Pond Used For REC — DA 0.45 SM

Dimensions of Pond: Width ______ Length ______ Area ~~[illegible]~~ 53.2

Total Length of Dam 425' Length of Spillway 16'

Depth of Water Below Spillway Level (Downstream) 14'

Height of Abutments Above Spillway ~~5'~~ 4'

Type of Spillway Construction

Type of Dike Construction

Downstream Conditions

Summary of File Data could cause damage in future - [illegible]
Construct. [illegible] issued by [illegible] Dec 49
No inspection or approval

49

Remarks

(OVER)

• A SPECIAL AWARD will go to the author of Suggestion No. 10,000. •
Send your suggestion to Employees' Suggestion Awards Program, 165 Capitol Ave., Hartford, 06115

terdepartment Message

STATE OF CONNECTICUT

SAVE TIME: *Handwritten messages are acceptable.*
Use carbon if you really need a copy. If typewritten, ignore faint lines.

	NAME	TITLE	DATE
To	Victor Galgowski	Supt. of Dam Maintenance	Feb. 13, 1979
	AGENCY: DEP - Water Resources	ADDRESS	
	NAME	TITLE	TELEPHONE
om	Charles Pelletier	Consultant	
	AGENCY	ADDRESS	

ASHFORD LAKE DAM - ASHFORD

This dam was inspected on February 7, 1979 in the company of Paul Biscuti.

It was evident that there had been substantial flow in the spillway during the recent high runoff.

The embankment is wide and supports a two lane roadway. There is nominal seepage flow in the vicinity of the outlet end of the drain down pipe. There are no trees on the dam. However, there is brush present which should be removed regularly. There is evidence that this has been done in the past.

Overflow is through an earthen channel which passes through a box culvert about 5 feet high and 10 feet wide at the extreme right hand end of the dam. The bottom of the channel may be rock lined, however this was not evident. Inspection under more favorable conditions will allow determination of the presence of a lining. There is no evidence of significant erosion of the channel.

The wing walls of the box culvert are cracked and in need of repair.

This dam is in acceptable condition. It is suggested that the seepage be monitored by the owner and occassionally be the State.

SAVE TIME: *If convenient, handwrite reply to sender on this same sheet.*

INDIAN TRAILS COUNCIL BOY SCOUTS OF AMERICA

SCOUTING/USA

5 Connecticut Avenue • Norwich, Connecticut 06360 • (203) 887-9291

April 18, 1980

Peter Heynen
Cahn Engineers
Barnes Industrial Park
Wallingford, CT 06492

Dear Mr. Heynen:

It is my understanding that you are doing a study of the Ashford Lake Dam that includes the effects downstream in the event of a breach of that dam.

I am not an alarmist. However, we are one of the largest property owners below the dam and we do have the responsibility for 250 Scout campers per week during the summer months. Would it be possible for us to have a copy of the report when it is completed?

Sincerely,

Tony Booth
Scout Executive

TB/cb

APPENDIX C

DETAIL PHOTOGRAPHS

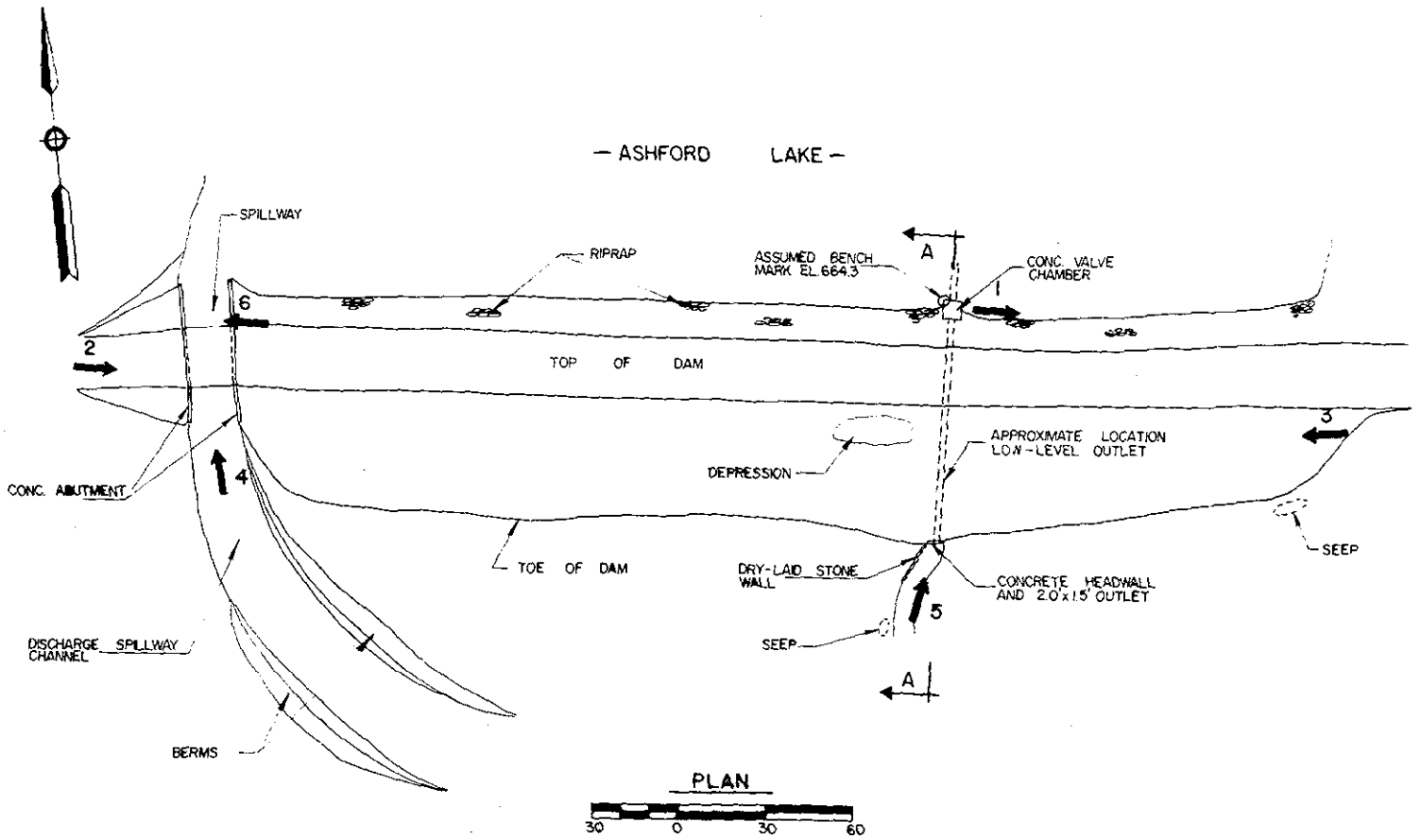


PHOTO LOCATION PLAN

ASHFORD LAKE DAM

SHEET C-1

Photo 1 - Erosion and riprap on upstream slope of dam taken from gate structure (March 1980).

Photo 2 - Unpaved road and potholes on top of dam taken from right abutment (March 1980).

Photo 3 - Downstream slope of dam from left abutment (March 1980).

Photo 4 - Spillway channel taken from downstream (March 1980).

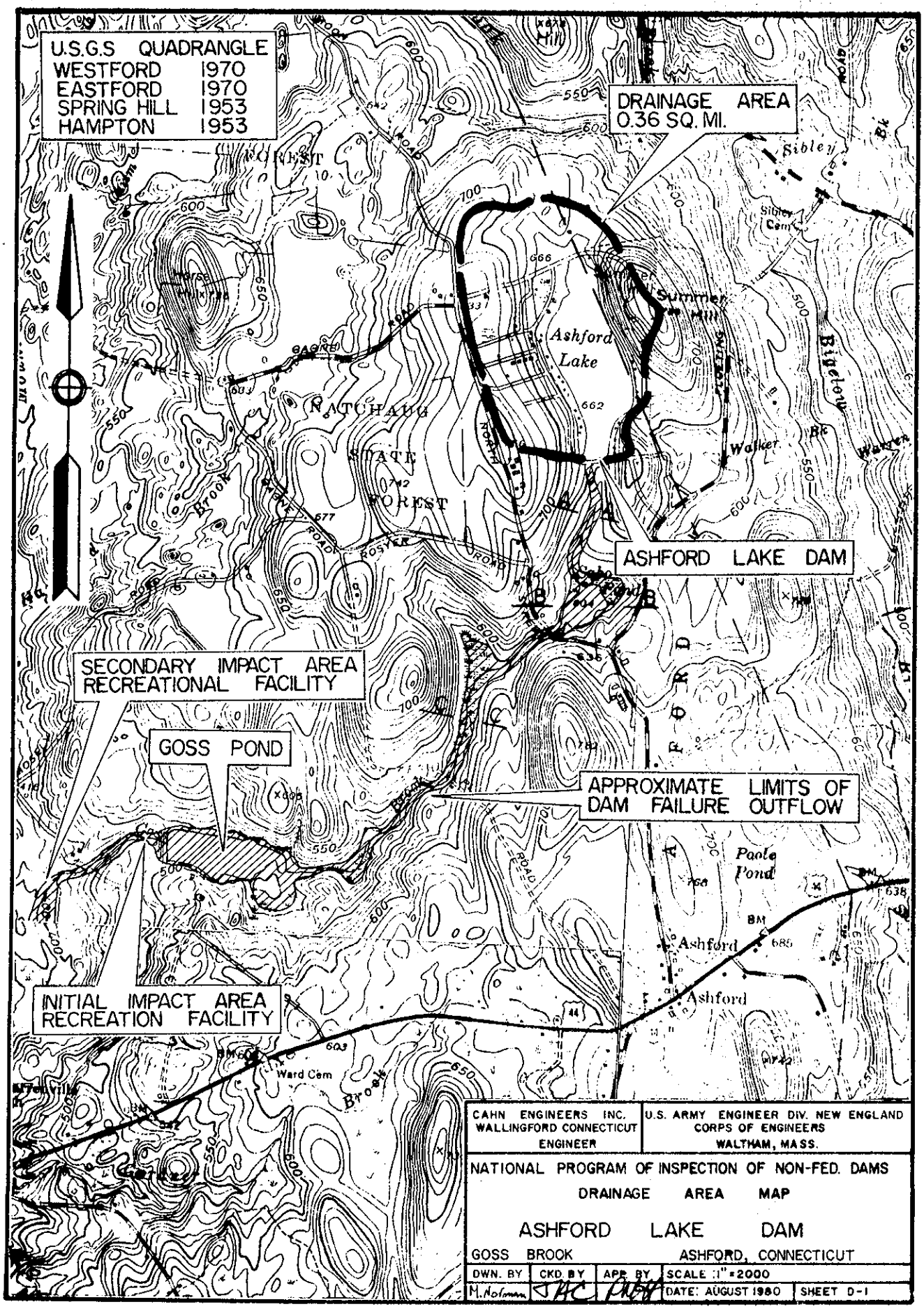
Photo 5 - Low-level outlet structure taken from discharge channel (March 1980).

Photo 6 - Craking of right spillway abutment wall (upstream) taken from spillway channel (March 1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Ashford Lake Dam Goss Brook Ashford, Ct.
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	CE#27785 KD DATE Aug. 1980 PAGE C-3

APPENDIX D

HYDRAULICS/HYDROLOGIC COMPUTATIONS



CAHN ENGINEERS INC. WALLINGFORD CONNECTICUT ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

DRAINAGE AREA MAP

ASHFORD LAKE DAM

GOSS BROOK ASHFORD, CONNECTICUT

DWN. BY	CKD BY	APP. BY	SCALE :1" = 2000	
M. Nofman	JAC	PAGA	DATE: AUGUST 1980	SHEET D-1

PROBABLE MAXIMUM FLOOD (PMF) DETERMINATION

DRAINAGE AREA—
THE TOTAL DRAINAGE AREA = 0.36 Sq. MILES
OBTAINED FROM PLANIMETERING THE DRAINAGE AREA FROM USGS MAP.

WATERSHED CLASSIFICATION— "ROLLING"
THIS CLASSIFICATION IS ASSIGNED BY EXAMINING THE USGS MAP AND A VISUAL INSPECTION OF SOME OF THE TERRAIN. HOWEVER, APPROXIMATELY 25% OF THE 0.36 Sq MILES CONSISTS OF FAIRLY FLAT LAND AND WATER BODY.

PMF PEAK INFLOW—
FROM THE CORPS OF ENGINEERS DECEMBER 1977 PEAK FLOW RATES GUIDE CURVE, FOR A DRAINAGE AREA OF 0.36 SQ MILES PMF WAS OBTAINED BY EXTRAPOLATION OF THE GUIDE CURVES FOR 0.26 Sq MILES (ROLLING) AND (0.1 SQ. MILES (FLAT.) AND THE COMBINATION YIELDS 2220 CFS/Sq. MILES.
∴ PMF PEAK INFLOW = 2220 × 0.36 ≅ 800 CFS.

SIZE CLASSIFICATION—
FOR THE PURPOSE OF DETERMINING PROJECT SIZE, THE MAXIMUM STORAGE ELEVATION IS CONSIDERED EQUAL TO THE TOP OF DAM ELEVATION. i.e TOP OF DAM ELEVATION 667.8*
ELEVATION OF THE TOE OF DAM AT LOWEST POINT 641.3
(FROM CAHN ENGINEERS FIELD DATA)
∴ HEIGHT OF DAM 26.5 FT.

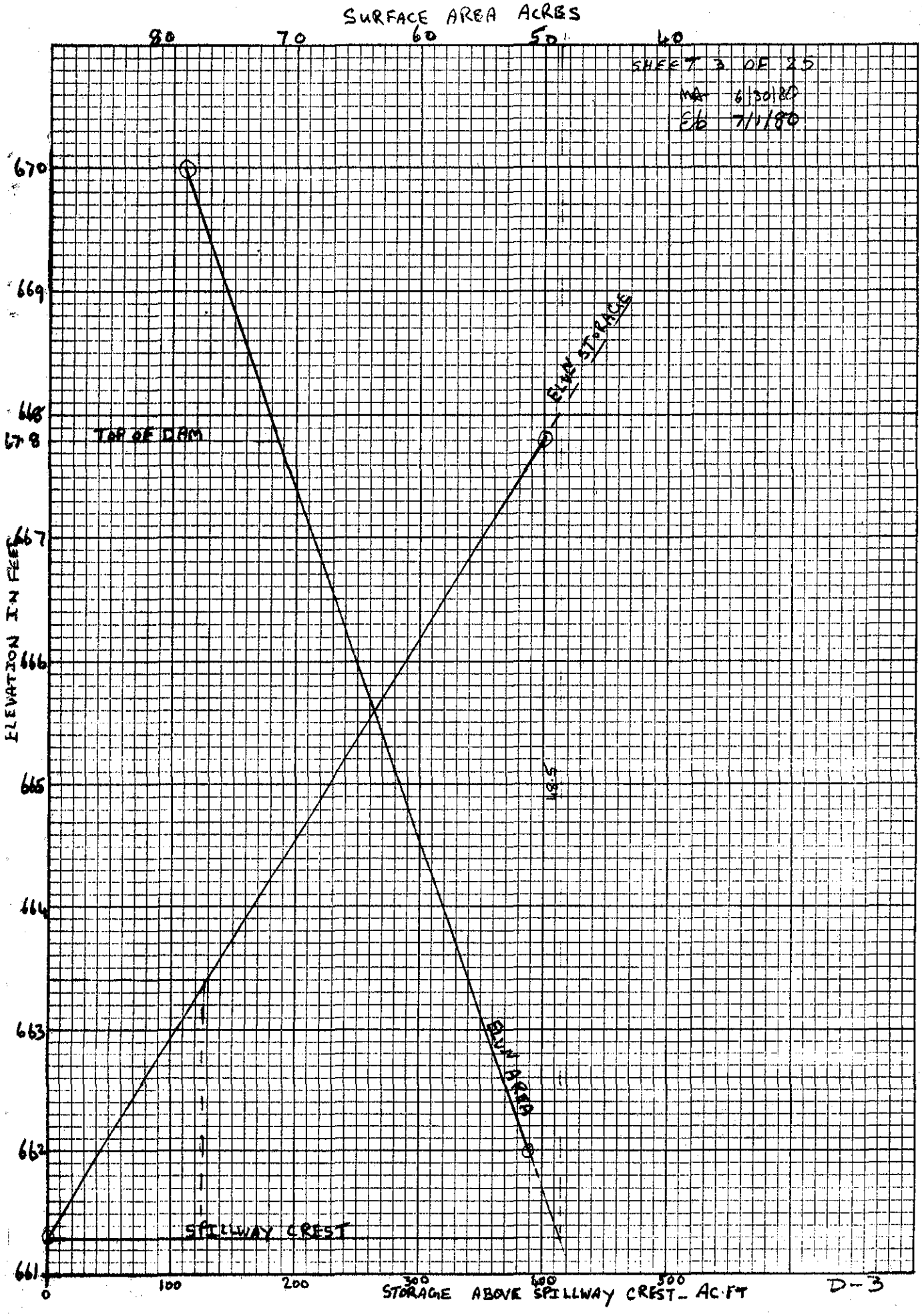
* ALL ELEVATIONS ARE NGVD AS TAKEN FROM AN ASSUMED DATUM.

PLANIMETERING FROM USGS MAP FOR LAKE SURFACE AREAS—
AT. EL. 662 (POOL ELV^N) = 51 ACRES
AT. EL. 670 = 79 ACRES
A STAGE LAKE AREA CURVE IS PLOTTED (SHEET 3)
LAKE AREA TO TOP OF DAM (EL. 667.8) FROM THIS CURVE = 71 Ac.
AVERAGE LAKE AREA BETWEEN SPILLWAY CREST & TOP OF DAM ≅ 60 ACRES.
∴ MAXIMUM STORAGE BETWEEN SPILLWAY CREST & TOP OF DAM = 6.5 × 60 ≅ 390 AC·FT.
ESTIMATED STORAGE BELOW SPILLWAY CREST = $\frac{1}{3}bh$
$= \frac{1}{3} \times 48.5 \times 20 \cong 325$ AC·FT.
(b = 48.5 ACRES FROM SHEET 3 AND h = EL. 661.3 − EL. 641.3 = 20 FT)
∴ MAXIMUM IMPOUNDMENT TO TOP OF DAM = STORAGE TO SPILLWAY CREST + STORAGE BETWEEN SPILLWAY CREST & TOP OF DAM
≅ 325 AC·FT + 390 AC·FT ≅ 715 AC·FT.

THUS, ACCORDING TO CORPS OF ENGINEERS GUIDELINES TABLE 1. THE ASHFORD LAKE DAM IS CLASSIFIED SMALL BASED UPON STORAGE (< 1000 & ≥ 50) AND THE HEIGHT OF DAM (< 40' & ≥ 25'). USING THE ABOVE DATA. A STAGE-STORAGE CURVE IS PLOTTED (SHEET 3) FOR LATER USE.

HAZARD POTENTIAL—

HIGH HAZARD
BASED ON DAM BREACH ANALYSIS AND RELATIVE LOCATIONS OF BOY SCOUT ACTIVITY SITES AND OTHER STRUCTURES. A DETAILED DISCUSSION OF HAZARD POTENTIAL IS INCLUDED AT THE END OF BREACH ANALYSIS SECTION OF APPENDIX-D.


SURFACE AREA ACRES
80
70
60
50
40
SHEET 3 OF 25
MA 6/30/80
EB 7/1/80
670
669
668
678
667
666
665
664
663
662
661
ELEVATION IN FEET
TOP OF DAM
ELEV STORAGE
ELEV AREA
SPILLWAY CREST
0
100
200
300
400
500
STORAGE ABOVE SPILLWAY CREST - AC-FT

TEST FLOOD PEAK INFLOW (QP_i)—

FOR THE SMALL SIZE AND HIGH HAZARD POTENTIAL CLASSIFICATION, TABLE 3 OF CORPS OF ENGINEERS RECOMMENDED GUIDELINES, THE TEST FLOOD COULD BE IN THE ½ PMF TO PMF RANGE. SINCE THE BOY SCOUT AND CUB SCOUT CAMP ACTIVITIES IN THE VICINITY OF GOSS POND ARE SEASONAL, ½ PMF IS SELECTED AS TEST FLOOD.

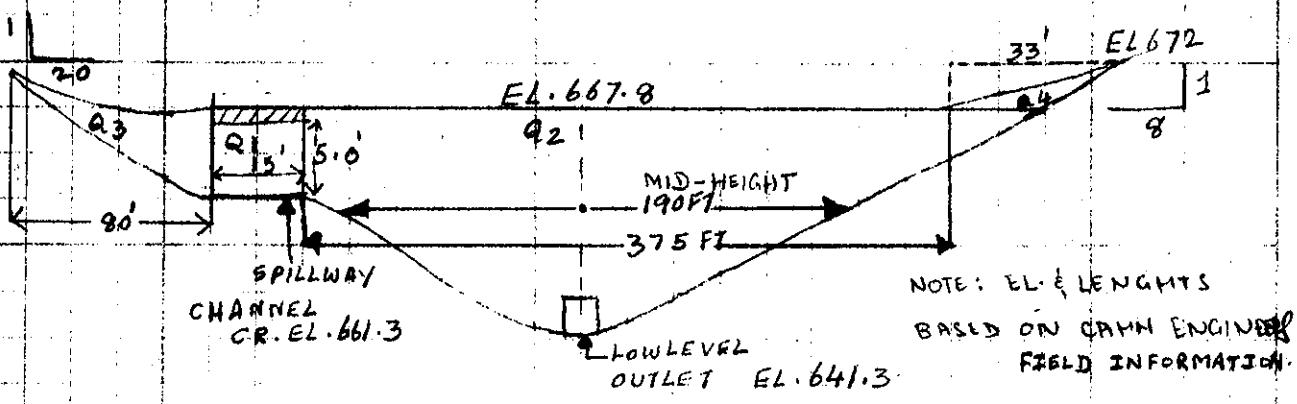
THE TEST FLOOD PEAK INFLOW = $\frac{1}{2} \times 800$ CFS = 400 CFS

½ PMF WOULD RESULT FROM $9\frac{1}{2}$" RUN-OFF FROM 0.36 SQ. MILES OF DRAINAGE AREA.

∴ TOTAL STORM VOLUME = $\frac{9.5}{12} \times 0.36 \times 640 \cong 182$ AC.FT.

THUS, MAXIMUM STORAGE (BETWEEN SPILLWAY CREST AND TOP OF DAM) OF 390 AC.FT IS 215% OF THIS STORM VOLUME.

TEST FLOOD ANALYSIS



POTENTIAL FLOOD OVERFLOW PROFILE.

DISCHARGE COMPUTATIONS

THE SPILLWAY IS 15'X5' GRAVEL AND STONE LINED CHANNEL.

$Q_1 = CL H^{3/2}$ WHERE $C = 2.6$; $L = 15'$

$\therefore Q_1 = 39 H^{3/2}$ (LOWER VALUE OF C CHOSEN BECAUSE OF IRREGULAR CHANNEL)

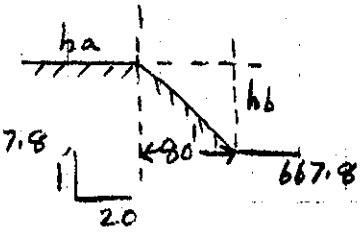
THE OVERFLOW CAPACITY OF THE EARTHERN DAM IS CALCULATED BY

$Q_2 = C \times L \times H^{3/2}$ WHERE $C = 2.7$, $L = 375$ FT

$\therefore Q_2 = 1012\ H^{3/2}$ CR. EL. 667.8

THE OVERFLOW CAPACITY OF THE RIGHT ABUTMENT IS CALCULATED BY THE USGS METHOD*

$$Q_3 = \frac{2}{5} C L \left(\frac{h_b^{5/2} - h_a^{5/2}}{h_b - h_a}\right)$$



$C = 2.7$; h_b IS TAKEN FROM EL. 667.8,

$h_a = 0$

SIMILARLY THE OVERFLOW CAPACITY Q_4 OF THE LEFT ABUTMENT IS CALCULATED BY THE USGS METHOD.

* USGS RECOMMENDED FORMULA FOR MORE PRECISE DISCHARGE OVER INCLINED DAM/EMBANKMENT CREST (REF: MEASUREMENT OF PEAK DISCHARGES AT DAMS BY INDIRECT METHODS, BOOK 3, CHAPTER A-5, PAGES 3-4, 1968)

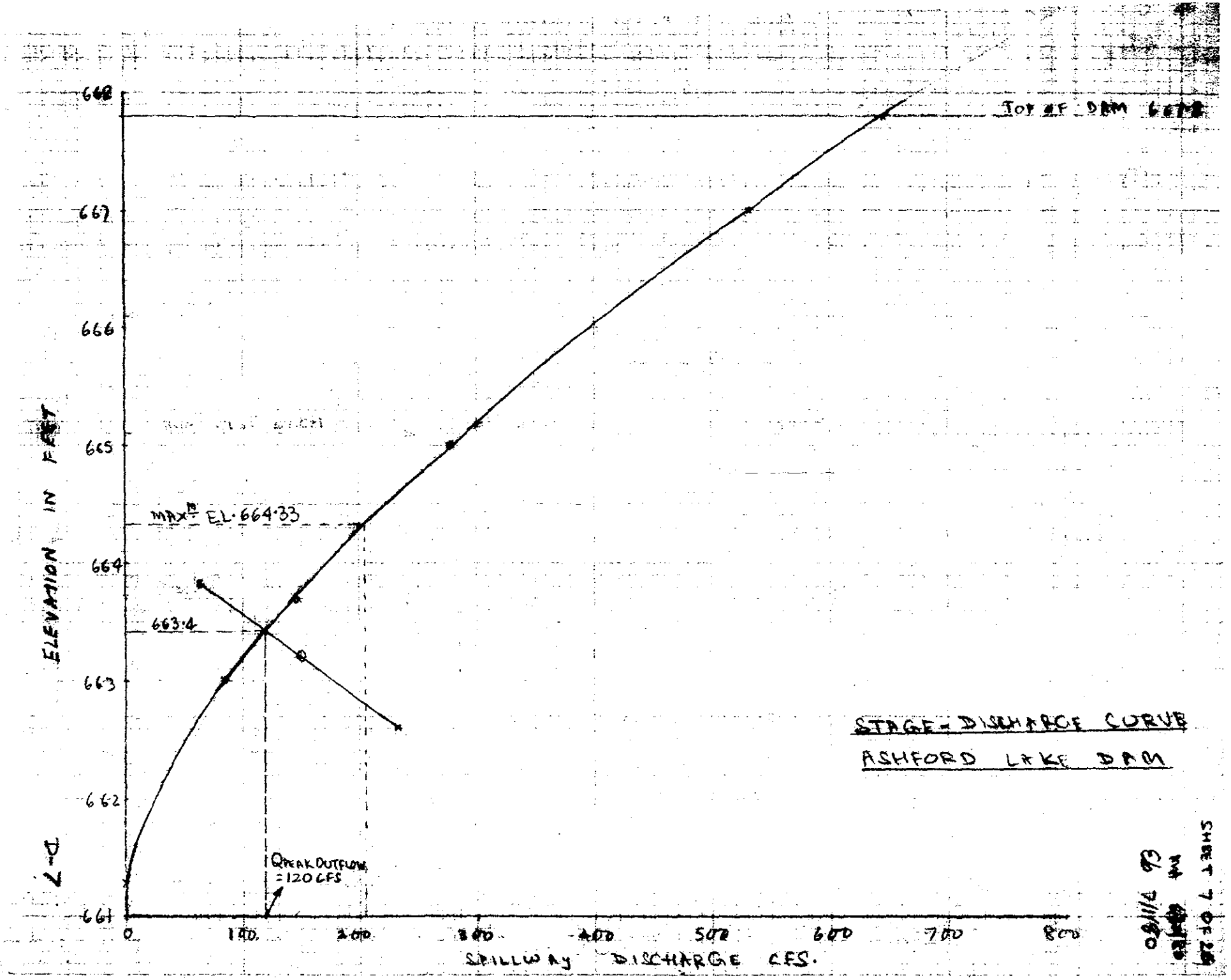
LOW-LEVEL OUTLET - THE DIMENSIONS OF THE CONDUIT IS ASSUMED TO BE 1.5 X 2 FT - AND THE DISCHARGE Q5 FOR POOL AT TOP OF DAM IS ESTIMATED TO BE 75 CFS ACCOUNTING FOR USUAL LOSSES.

TABULATION OF DISCHARGE RATES

	ELEV.	SPILLWAY Q_1 CR. EL = 661.3	DAM Q_2 CR. EL = 667.8	RIGHT ABUTMENT Q_3 EL. 667.8	LEFT ABUTMENT Q_4 EL. 667.8	TOTAL OVERFLOW CAPACITY Q CFS. $Q_1+Q_2+Q_3+Q_4$
	663	86	0	0	0	86
TEST FLOOD EL. →	663.4	120	0	0	0	120
	665	278	0	0	0	278
DAM	667.8	531	0	0	0	531
CR. EL →	667.8	646	0	0	0	646

NOTE: CONSIDERING THE TOTAL DISCHARGE CAPACITIES ABOVE, THE DISCHARGE CAPACITY OF THE LOW LEVEL OUTLET IS NEGLECTED.

IT CAN BE SEEN FROM THE ABOVE TABULATION, THAT THE $\frac{1}{2}$ PMF OF 400 CFS CAN PASS THE SPILLWAY WITH SOME FREE BOARD LEFT. A STAGE - SPILLWAY DISCHARGE CURVE IS PLOTTED FOR FURTHER USE ON SHEET 7.


668
667
666
665
664
663
662
661
ELEVATION IN FEET
TOP OF DAM 668
MAX^M EL. 664.33
663.4
QPEAK OUTFLOW
=120 CFS
0
100
200
300
400
500
600
700
800
SPILLWAY DISCHARGE CFS.
STAGE - DISCHARGE CURVE
ASHFORD LAKE DAM

DETERMINATION OF PEAK OUTFLOW

SHORTCUT ROUTING OF RESERVOIR —

FOR TEST FLOOD INFLOW OF 400CFS (QP), ½ PMF HAS 9½" OF RUN-OFF FROM THE DRAINAGE AREA.

FOR A ½ PMF STORM VALUE OF 182 AC.FT. THE STAGE-STORAGE CURVE GIVES AN ELVN = 664.33
∴ THIS IS A MAXIMUM ELEVATION
FROM STAGE-DISCHARGE CURVE ON SHEET 7 FOR EL. 664.33
Q = 205 CFS.
∴ Q OUTFLOW ≤ 205 CFS
HENCE, SELECT STORi RANGE ≤ 9½"

$$QP_1 = QP_1 \left(1 - \frac{STORi}{9\frac{1}{2}}\right) \text{ FOR } QP_1 = 400 \text{ CFS.}$$

① STORi (INCHES)	② $\left(1 - \frac{STORi}{9\frac{1}{2}}\right)$	③ STORi (AC.FT) ① × AREA	④ QPi (CFS) ② × 400	⑤ ELVN. USING ③ (STAGE-STORAGE CURVE)
8"	0.158	153	63	663.85
6"	0.368	115	147	663.21
4"	0.579	77	232	662.6

PLOTTING QPi AND ELVN ABOVE ON STAGE-DISCHARGE CURVE ON SHEET 7, YIELDS. PEAK Q OUTFLOW = 120 CFS.
AND PEAK OUTFLOW ELVN = 663.4
TOP OF DAM ELVN = 667.8
PEAK OUTFLOW ELVN = 663.4
FREE BOARD = 4.4 FT

BREACH ANALYSIS

DAM WIDTH @ MID HEIGHT = 190' (PER CAHM ENGINEERS FIELD DATA)

W_b = 40% × 190 = 76 FT

Y_o = EL. 663.4 − EL. 641.3 = 22.1 FT

BREACH OUTFLOW $Q_b = \frac{8}{27} \times W_b \times \sqrt{g} \times Y_o^{3/2}$

$= \frac{8}{27} \times 76 \times \sqrt{32.2} \times (22.1)^{3/2} = 13,275$ CFS

PEAK FAILURE OUTFLOW $Q_{P_1} = Q_b$, SINCE THE SPILLWAY DISCHARGE OF 120 CFS IS CONSIDERED IMSIGNIFICANT.

∴ PEAK FAILURE OUTFLOW Q_{P_1} = 13,275 CFS

RESERVOIR STORAGE TO MAX^M POOL EL = 450 Ac FT

(STORAGE TO SPILLWAY CREST + STORAGE BETWEEN SPILLWAY CREST & MAX^M POOL) 126 FROM STAGE-STORAGE CURVE

(SEE SHEET 325 D)

ESTIMATED FAILURE FLOOD DEPTH ≅ .44 × Y_o = .44 × 22.1 = 9.7 FT

PERFORM DOWNSTREAM ROUTING OF PEAK FAILURE OUTFLOW

SELECT A SECTION A-A, WHICH IS 800' D/S OF DAM; USING MANNING EQUATION

$Q = A \times \frac{1.486}{n} \times R^{2/3} \times S^{\frac{1}{2}}$

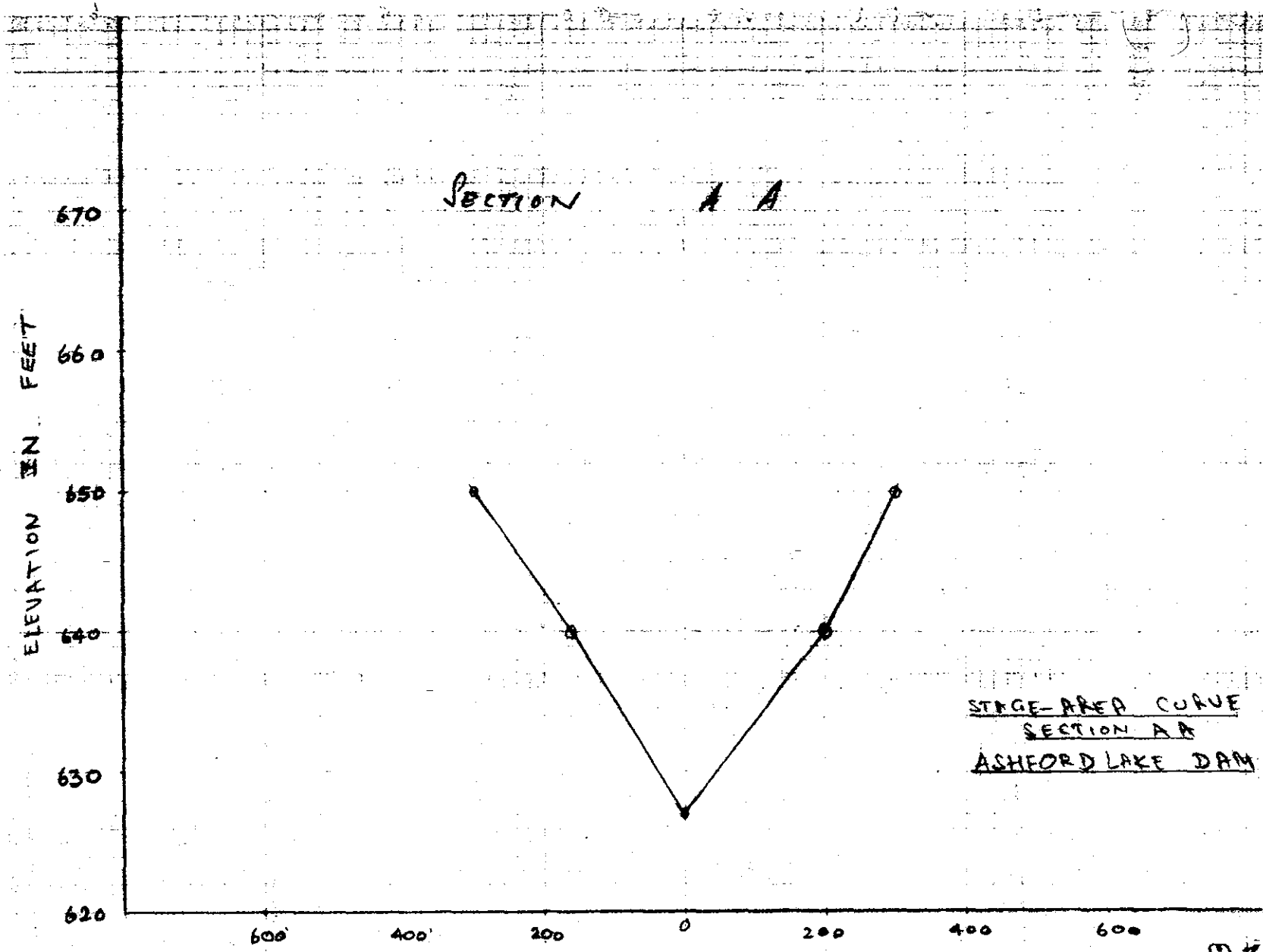
$= 3.37 A R^{2/3}$

n = 0.075 ASSUMED

S = 0.03 ESTIMATED FROM USGS MAP

ELV^M	A Ft²	P	R = A/P	$R^{\frac{2}{3}}$	Q CFS.
627	0	—	—	—	—
630	132 ✓	98.	1.50 ✓	1.31 ✓	583 ✓
640	2340.	361.	6.48	3.50 ✓	27,600

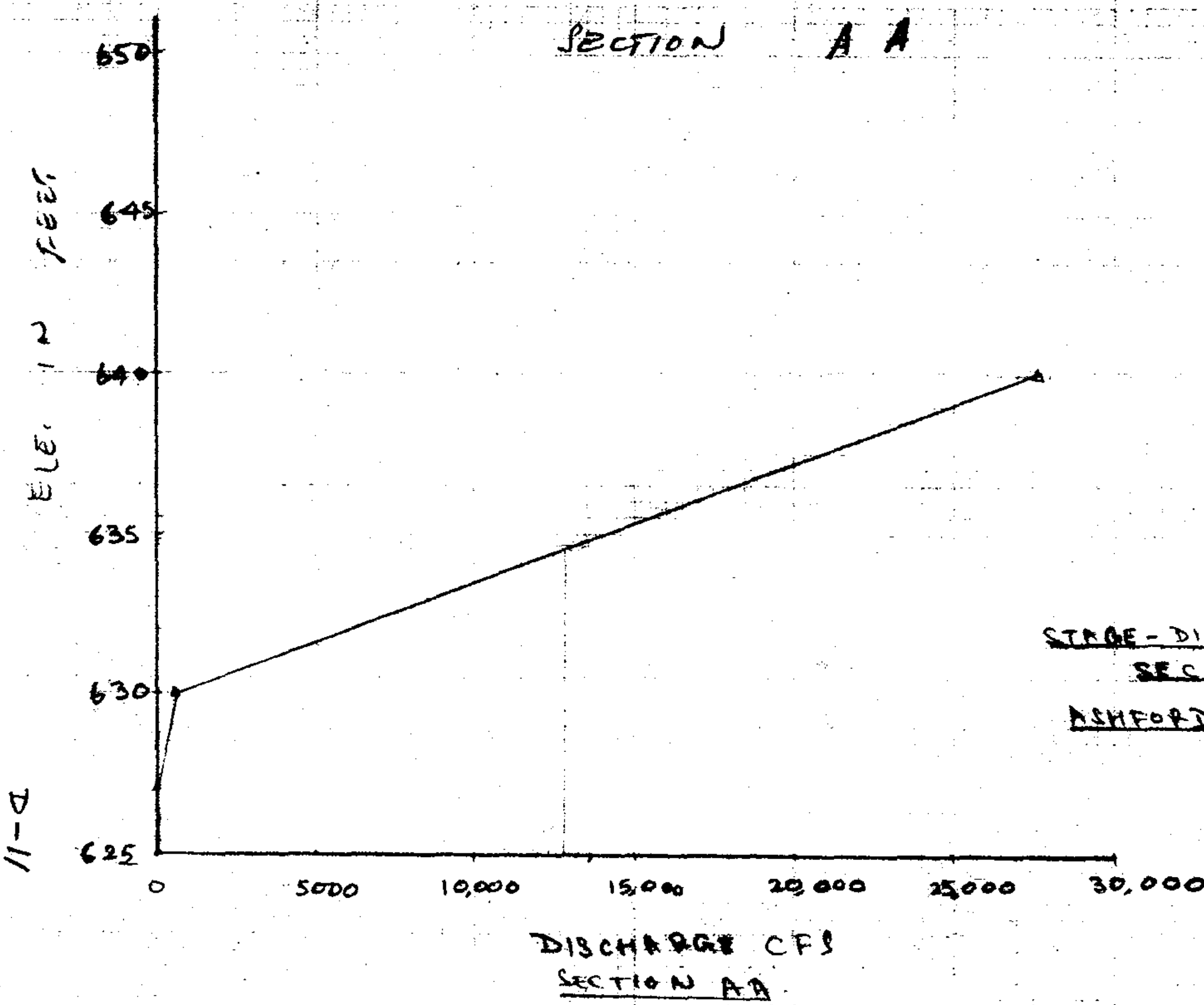
STAGE-AREA AND STAGE-DISCHARGE CURVES ARE PLOTTED FOR SECTION-AA.



STAGE-AREA CURVE
SECTION A A
ASHFORD LAKE DAM

D-10

SHEET 10 OF 10



STAGE - DISCHARGE CURVE
SECTION 'AA'
ASHFORD LAKE DAM

SHEET 1 of 26
7/11/93

FOR PEAK FAILURE OUTFLOW Q_{P_1} = 13,275 CFS
STORAGE AT TIME OF BREACH = 450 Ac.Ft.
FROM STAGE-DISCHARGE CURVE FOR A-A' SHEET 11, WE OBTAIN EL = 634.6
AND FOR THIS EL. FROM STAGE-AREA CURVE ON SHEET 10, WE OBTAIN AN AREA → 798 SQ FT.

REACH LENGTH = 800'

∴ VOLUME IN REACH $V_1 = \frac{800 \times 798}{43,560} = 14.6$ Ac·Ft

TRIAL $Q_{P_2} = Q_{P_1}\left(1 - \frac{V_1}{S}\right)$

$= 13,275\left(1 - \frac{14.6}{450}\right)$

$= 12,844$ CFS

FOR THIS Q_{P_2}, WE OBTAIN FROM STAGE-DISCHARGE CURVE AND STAGE-AREA CURVE
EL = 634.5 AND AREA = 780 SQ FT.

$V_2 = \frac{800 \times 780}{43,560} = 14.3$ Ac Ft

RECOMPUTING $Q_{P_2} = 13,275\left(1 - \frac{V_1 + V_2}{450}\right) = 12,860$ CFS

AND FLOOD STAGE = 634.5 FROM STAGE DISCHARGE CURVE

∴ DEPTH OF FLOOD WATER AT SECTION AA = EL. 634.5 − EL. 627.0 = 7.5 Ft

AND VELOCITY AT SECTION AA $= \frac{12,860}{790} = 16.3$ FPS (HIGH)

SELECT SECTION BB, 1400 FT D/S OF AA

Q_{P_1} = 12,850 CFS

STORAGE REMAINING

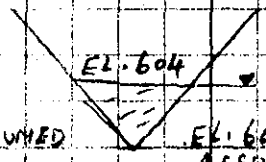
S = 460 − 14.4 = 435.6 Ac.Ft

$Q = A \times \frac{1.486}{n} \times R^{2/3} S^{1/2}$ n = 0.075 ASSUMED

$= A \times 19.81 \times R^{2/3} \times 0.12$ S = 0.015 ESTIMATED FROM USGS MAP.

$= 2.38\, A\, R^{2/3}$

Sabo Pond



El.	A	P	$R = \frac{A}{P}$	$R^{2/3}$	Q.
602	0	—	—	—	—
605	1,280	670.1	1.91	1.54	4,690
610	5,205	900.4	5.78	3.22	39,900

THE CURVES ARE PLOTTED ON SHEETS 14 & 15.
FOR Q_{P_1} = 12,850 CFS WE FIND EL. 606.1 FROM THIS CURVE AND AREA = 2047 SQ FT.
REACH LENGTH = 1400 FT. (AA TO BB)
AND V_1 IN THIS REACH = $\frac{2047 \times 1400}{43,560}$ = 65.8 Ac.Ft

TRIAL $Q_{P_2} = Q_{P_1}\left(1 - \frac{V_1}{S}\right) = 12,850\left(1 - \frac{65.8}{435.6}\right) = 10,908$ CFS

FOR THIS Q_{P_2} WE OBTAIN ELVN. = 605.8 AND AREA = 1832 ft²

$\therefore \frac{1400 \times 1832}{43,560}$ = 58.9 Ac.Ft.

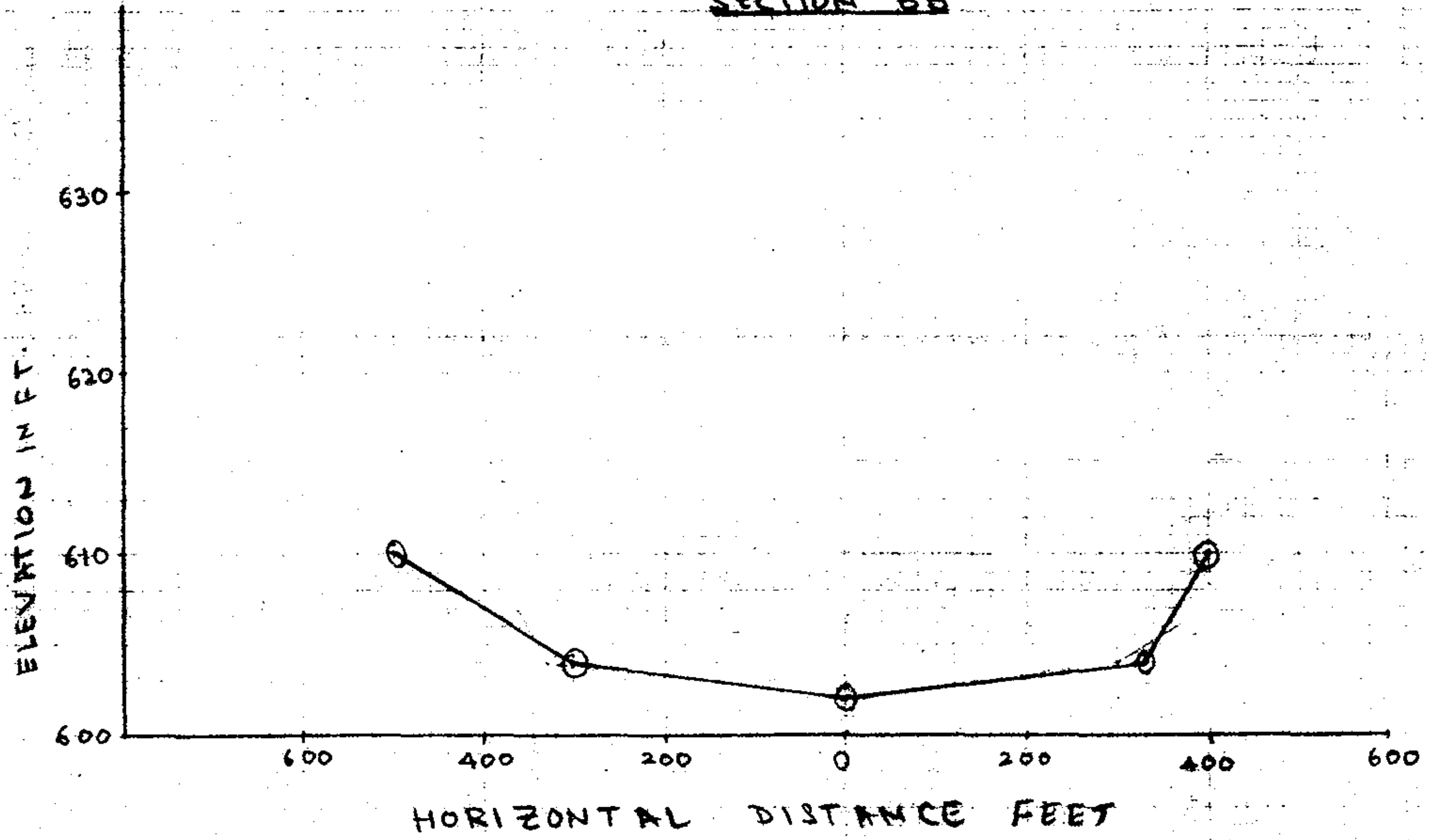
RECOMPUTING → $Q_{P_2} = 12,850\left[1 - \frac{(65.8 + 58.9)/2}{435.6}\right]$ = 11,000 CFS

AND FLOOD STAGE = 605.9

∴ DEPTH OF FLOOD WATER = EL. 605.9 − 602.0 = 3.9 FT AT SECTION BB

VELOCITY AT SECTION BB = $\frac{11,010}{1906}$ = 5.8 FPS

SECTION BB



LOOKING DOWNSTREAM

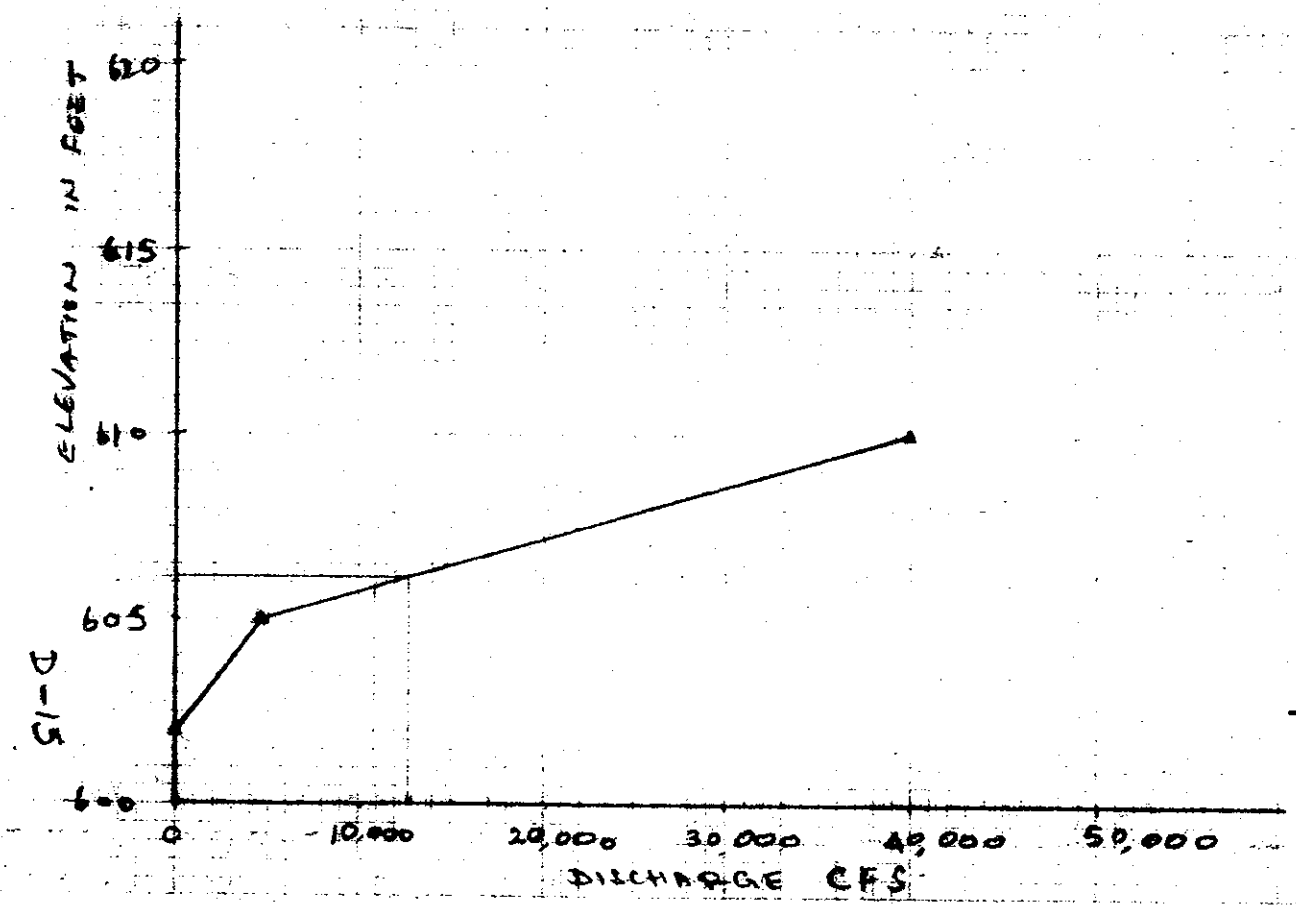
1400 FT. D/S OF AA

STAGE - AREA

ASHFORD LAKE DAM

D-14

SECTION B-B



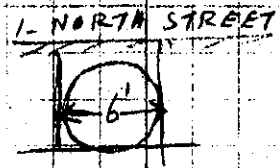
STAGE - DISCHARGE CURVE
ASHFORD LAKE DAM

D-15

SHEET 15 OF 15

THUS, THE SABO POND ELVN INCREASES FROM 604 TO 605.9 ± THIS WILL CAUSE OVERTOPPING OF THE 6'± HIGH STONE DAM (WHICH IS ALREADY BREACHED)

THE 6' DIA CONCRETE CULVERT ON NORTH STREET IMMEDIATELY BELOW THE SABO POND CAN TAKE A MAXIMUM OF 320 CFS WITH $\frac{HW}{D} = 1.42$



THUS, THERE ARE 2 POSSIBILITIES —
(a) THE ROAD WILL BE OVERTOPPED
(b) THE CULVERT WILL WASH OUT

(a) SINCE THERE ARE NO HOUSES RELATIVELY CLOSE AND AT LOW ELVN TO THIS CULVERT, OVERTOPPING OF THE ROAD WILL INUNDATE A STRETCH OF ROAD AND CAUSE INCONVENIENCE TO THE TRAFFIC. OTHER THAN THIS, THERE WOULD BE NO OTHER HAZARD.

(b) FOR THIS CONDITION, PEAK FAILURE OUTFLOW ROUTING IS DONE AT SECTION CC WHICH IS SELECTED 2600 FT. D/S OF SECTION BB

REPEATING THE ROUTING PROCESS AT SECTION CC —

Q_{P_1} = 11,000 CFS

STORAGE REMAINING S = 435.6 − 62.35 = 373.25 AC-FT

$n = 0.075$

$S = 0.02$ ESTIMATED FROM USGS MAP

$Q = A \times \frac{1.486}{n} \times R^{2/3} \times S^{1/2}$

$= A \times 19.81 \times R^{2/3} \times 0.12 = 2.38\, A R^{2/3}$

EL.	A	P	$R = \frac{A}{P}$	$R^{2/3}$	Q CFS
570	0	—	—	—	—
580	1900	380.5	4.99	2.92	13,200
590	6300	502.2	12.54	5.4	80,970

THE TWO CURVES (SHEET 18 & 19) ARE PLOTTED.
FOR Q_{P_1} = 11,000 CFS, THIS CURVE FOR 'CC' GIVES A STAGE = EL. 578.7

AND AREA = 1409 SQ. FT. IS OBTAINED FROM STAGE-AREA

LENGTH OF REACH (BB & CC) = 2600 FT

AND V_1 IN THIS REACH = $\frac{1409 \times 2600}{43,560}$ = 84.1 Ac FT

TRIAL $Q_{P_2} = Q_{P_1}\left(1 - \frac{V_1}{S}\right)$

$= 11,000\left(1 - \frac{84.1}{373.25}\right)$

$= 8,528$ CFS

FOR THIS Q_{P_2} WE OBTAIN ELV^N FROM CURVE = 577.1
AND AREA OF CROSS SECTION = 958 SQ FEET

$\therefore V_2 = \frac{2600 \times 958}{43,560} = 57.2$ Ac FT

RECOMPUTING $Q_{P_2} = 11,000\left(1 - \frac{84.1 + 57.2}{373.25}\right)$

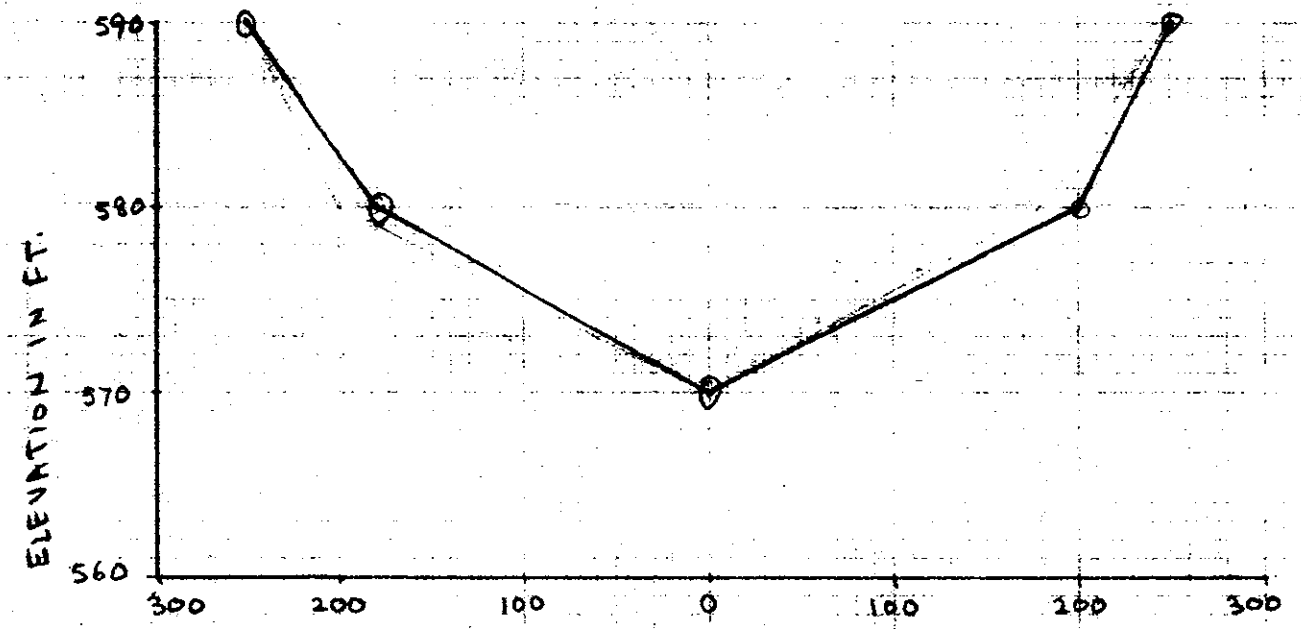
$= 8925$ CFS

$\therefore$ FLOOD STAGE = 577.4

DEPTH OF FLOOD WATER = EL. 577.4 − EL. 570
= 7.4 FT AT SECTION CC

VELOCITY AT SECTION CC = $\frac{8925}{1036} = 8.6$ FPS

SECTION CC



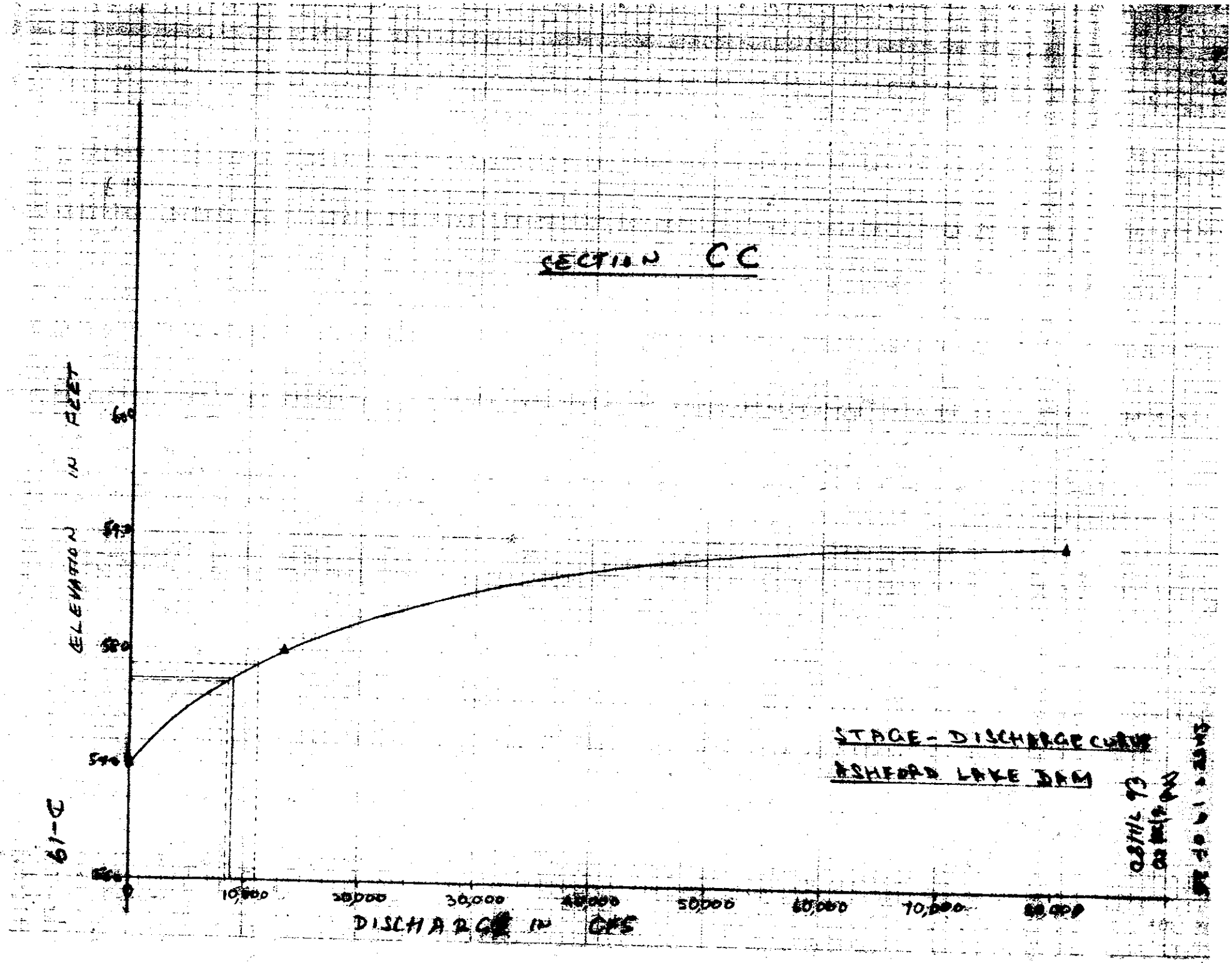
2600FT. D/S OF BB

STAGE–AREA

ASHFORD LAKE DAM

B1-D

08/11/93


SECTION CC
ELEVATION IN FEET
DISCHARGE IN CFS
STAGE - DISCHARGE CURVE
ASHFORD LAKE DAM
61-C

CONDITIONS DOWNSTREAM OF SECTION CC—

AT SECTION CC, FLOOD FLOW AND VOLUME REMAINING—

$Q_{P_1} = 8,925$ CFS

AND $S = 373.25 - 70.65 = 302.6$ Ac Ft

WITHOUT FURTHER FLOOD ROUTING, THE FOLLOWING ANALYSIS IS PRESENTED—

(a) BETWEEN SECTION 'CC' AND THE EASTERN EDGE OF GOSS POND, THERE ARE NO BUILDINGS EXCEPT A DIRT ROAD (PLATT ROAD) IN THE BOY SCOUT CAMP WHICH COULD BE SUBJECTED TO INUNDATION. HOWEVER, THIS ROAD IS INFREQUENTLY USED BY CAMPERS.

(b) AT SECTION CC FOR A STAGE OF 577.4, THE CROSS SECTIONAL AREA OF THE STREAM CHANNEL IS 1036± Sq Ft PER STAGE-AREA CURVE ON SHEET 18

BETWEEN SECTION CC AND EASTERN EDGE OF GOSS POND, THE LENGTH OF REACH = 4,000 ± Ft.

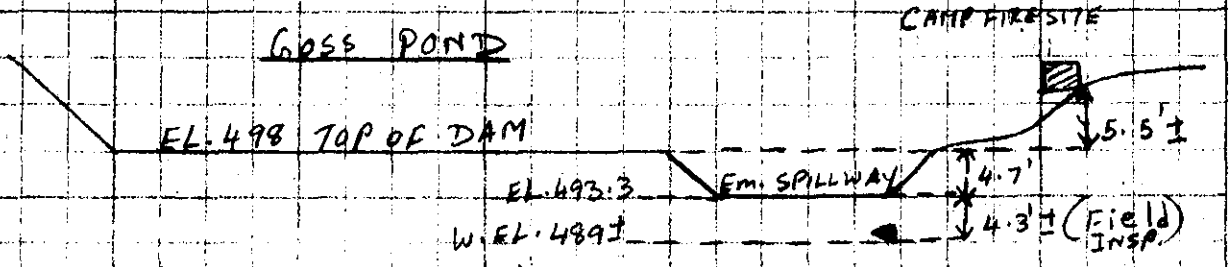
ASSUMING, THIS REACH TO HAVE SIMILAR STORAGE CHARACTERISTICS AS THE PREVIOUS SECTION, THE FLOOD VOLUME USED-UP PRIOR TO THE EASTERN EDGE OF GOSS POND

$$= \frac{1,036 \times 4000}{43,560}$$

$$= \underline{95}^{\pm} \text{ Ac Ft}$$

THUS, FLOOD VOLUME REMAINING $= 302.6 - 95.$
WHICH IS APPROXIMATELY EQUIVALENT $\cong \underline{208}$ Ac Ft
TO A DISCHARGE OF 610 ± CFS.
AT THE EASTERN EDGE OF GOSS POND.

(c) EXAMINATION OF THE EFFECT OF 208± Ac FT. FLOOD VOLUME ON GOSS POND –



THE ANALYSIS IS MADE BASED ON INFORMATION FROM SCS DATA FILE (SCS PLANNED AND DESIGNED GOSS POND); 2 SHEETS OF SCS DATA ARE ATTACHED FOR REFERENCE.

DURING STORM CONDITION; THE WATERSHED FOR GOSS POND BEING CONTIGUOUS TO ASHFORD LAKE WATERSHED, IT IS ASSUMED THAT AT ASHFORD LAKE DAM BREACH PERIOD, THE FLOOD STORAGE CAPACITY IN GOSS POND WILL BE VERY LIMITED (NOT EVEN 78 Ac FT IDENTIFIED IN SCS DATA SHEET); WHICH IS LESS THAN 38% OF THE NEEDED STORAGE FOR 208± Ac. Ft.

DURING STORM PERIOD, THE WATER ELEVATION IN GOSS POND CAN BE EXPECTED TO BE ABOVE THE EMERGENCY SPILLWAY CHANNEL (EL. 493.3). THUS, EVEN AT BEST OF CONDITIONS, THE WATER ELEVATION IN GOSS POND CAN BE EXPECTED TO RISE BY APPROXIMATELY 8.6'. THIS IS BASED ON POND SURFACE AREA AT NORMAL POOL OF 24 ACRES. THUS, GOSS POND DAM IS EXPECTED TO BE OVERTOPPED BY 8.1' – 4.7' = 3.9'±. SAY 4± FT.

THIS CONCLUSION CAN BE SUBSTANTIATED BY NOTING THAT, THE CAPACITY OF THE EMERGENCY SPILLWAY WHEN POOL IS AT TOP OF DAM IS ONLY 7000 CFS WHICH IS LESS THAN THE REQUIRED CAPACITY FOR ASHFORD LAKE DAM BREACH (AT SECTION CC Q_R IS ESTIMATED TO BE 9,925 CFS).

(d) IMPACTS — AS A RESULT OF THE ANALYSIS AS DISCUSSED IN (c) ABOVE, SEVERAL ACTIVITY AREAS AT THE BOY SCOUT CAMP COULD BE ADVERSELY IMPACTED.

THE RISE IN POOL ELEVATION AT GOSS POND BY 8.6± FT. COULD INUNDATE BEACH AND BOAT LAUNCHING AREAS AND PORTIONS OF THE CAMPARE SITE WHICH IS APPROX. 10'± ABOVE THE EMERGENCY SPILLWAY CHANNEL ELEVATION.

ONE OF THE CAMPSITES IS DIRECTLY BELOW THE EMERGENCY SPILLWAY CHANNEL SOME 600± FT AND DURING DAM FAILURE THE EMERGENCY SPILLWAY GETS ACTIVATED AND THIS CAMPSITE COULD BE INUNDATED BY AS MUCH AS 8.6'± OF FLOOD WATER.

IMMEDIATELY, DOWNSTREAM OF GOSS POND, A RIFLE RANGE EXISTS ADJACENT TO GOSS BROOK. THE EXPECTED OVERTOPPING OF GOSS POND, WOULD CERTAINLY INUNDATE THIS RIELE RANGE.

FURTHER, DOWNSTREAM 1600'±, A CUBSCOUT ACTIVITIES SITE IS LOCATED ADJACENT TO GOSS BROOK. THIS SITE, IS 7'± ABOVE THE STREAM BED AND THUS COULD BE EXPECTED TO BE IMPACTED (SECONDARY) DURING SEVERE STORM CONDITION, WHEN ASHFORD LAKE DAM BREACHES BY 1± FT OF FLOOD WATER.

THUS, IT CAN BE SEEN FROM THE ABOVE DISCUSSION, A HAZARD POTENTIAL OF HIGH MAGNITUDE IS CONSIDERED LIKELY.

IT IS SUGGESTED THAT A FURTHER DETAILED ANALYSIS, NOT WITHIN THE SCOPE OF PHASE I STUDY, SHOULD BE CONDUCTED TO PROPERLY DELINEATE THESE CONCERNS BELOW GOSS POND DAM

SUMMARY- HYDRAULIC/HYDROLOGIC COMPUTATIONS

TEST FLOOD PEAK INFLOW ½ PMF	400 CFS
PERFORMANCE AT PEAK FLOOD CONDITIONS:	
PEAK INFLOW	400 CFS
PEAK OUTFLOW	120 CFS
SPIL.CAP. TO TOP OF DAM (EL.667.8)	646 CFS
SPIL.CAP. TO TOP OF DAM % OF TEST FLOOD OUTFLOW	538%
SPIL.CAP. TO TEST FLOOD ELVN.	120 CFS
SPIL.CAP. TO TEST FLOOD ELVN.% OF TEST FLOOD OUTFLOW	100%
TEST FLOOD-DAM OVERTOPPED:	NO
MAXIMUM POOL ELEVATION	EL.663.4
MAXIMUM SURCHARGE HEIGHT ABOVE SPILLWAY CREST	2.1 FT
NON-OVERFLOW SECTION OF THE DAM OVERTOPPED BY	N.A.
FREEBOARD TO TOP OF DAM	4.4 FT
DOWNSTREAM FAILURE CONDITIONS:	
TOTAL PEAK FAILURE OUTFLOW	13,275 CFS
HEIGHT AT TIME OF FAILURE	9.7 FT
CONDITIONS AT INITIAL IMPACT AREA: (GOSS POND)	
ESTIMATED STAGE BEFORE FAILURE(EMERG.SPILWAY EL.)	EL.493.3
ESTIMATED STAGE AFTER FAILURE	EL.501.9
ESTIMATED RAISE IN STAGE AFTER FAILURE Y_1	8.6±FT
CONDITIONS AT SECONDARY IMPACT AREA:(CUBSCOUTS ACTIVITIES SITE) SEE H & H ANALYSIS, D.22	

TSC-NE-ENG-1
6-13-75

INFORMATION STORAGE AND RETRIEVAL - DAMS PLANNED AND CONSTRUCTED BY SCS

CT-3
SITE ID NO.

GOSS POND

IDENTIFICATION AND LOCATION

1. Eastern Conn. Boy Scout Pond — STRUCTURE DESIGNATION (NAME OR NUMBER)
2. Mount Hope - Shetucket — RIVER BASIN (NAME)
3. Goss Brook — WATERSHED (NAME OR UNNAMED)
4. Connecticut — STATE (NAME)
5. Windham — COUNTY (NAME)
6. Ashford — TOWNSHIP (NAME)
7. 2 — CONGRESSIONAL DISTRICT (NUMBER)
8. ~~Eastern Highlands~~ NEW ENGLAND UPLAND — PHYSIOGRAPHIC AREA 1/ (NAME)
9. CO-01 — AUTHORIZATION (WP, FP, RC&D, CO-01, PILOT)
10. 41 52 46 — LATITUDE (DEGREES, MINUTES, SECONDS)
11. 72 09 04 — LONGITUDE (DEGREES, MINUTES, SECONDS)
12. 498.0 — ELEVATION OF TOP OF DAM (SETTLED FILL-FEET MSL)
13. DATE PLAN APPROVED —
14. DATE OF MOST RECENT SUPPLEMENT (LEAVE BLANK IF NOT SUPPLEMENTED) —
15. DATE CONSTRUCTION COMPLETED 1963 (LEAVE BLANK IF NOT COMPLETED)
16. TYPE OF DAM (CIRCLE APPLICABLE) - EARTH, ROCK, CONCRETE, OTHER
17. PLANNED PURPOSES (~~CIRCLE ALL APPLICABLE~~) FLOOD PREVENTION, ~~RECREATION, FISH & WILDLIFE~~, MUNICIPAL AND INDUSTRIAL WATER SUPPLY, IRRIGATION, NAVIGATION, HYDRO-ELECTRIC, SEDIMENT CONTROL, LOW FLOW AUGMENTATION, OTHER
18. HAZARD CLASS (A, B, OR C) B
19. EARTHQUAKE ZONE 2/ (0, 1, 2, 3, or 4) 1

SIZE AND CAPACITY

20. DRAINAGE AREA UNCONTROLLED 1158 AC. (UPSTREAM FROM STRUCTURE)
21. DRAINAGE AREA CONTROLLED — AC. (UPSTREAM FROM STRUCTURE)
22. MAXIMUM FILL HEIGHT 38 FT. (FROM LOW POINT ON CENTERLINE, BEFORE EXCAVATING, TO TOP OF SETTLED FILL.)
23. CREST LENGTH OF DAM (ALONG CENTERLINE) 650 FT.
24. VOLUME OF FILL 47,000 CU. YD.
25. SUBMERGED SEDIMENT STORAGE — AC. FT.
26. AERATED SEDIMENT STORAGE — AC. FT.
27. MUNICIPAL AND INDUSTRIAL WATER STORAGE — AC. FT.
28. RECREATION WATER STORAGE — AC. FT.
29. FISH AND WILDLIFE STORAGE 341 AC. FT.
30. IRRIGATION STORAGE — AC. FT.
31. OTHER BENEFICIAL STORAGE — AC. FT.
32. TOTAL FLOOD STORAGE # 78 AC. FT. ?
33. TEMPORARY EMERGENCY SPILLWAY STORAGE (BETWEEN CREST OF LOWEST EMERGENCY SPILLWAY AND TOP OF SETTLED FILL) 176 AC. FT. ?
34. SURFACE AREA OF NORMAL POOL 24 AC. ✓
35. LENGTH OF SHORE LINE OF NORMAL POOL 0.9 MILES
36. MAXIMUM DEPTH OF NORMAL POOL 19.5 FT.

PRINCIPAL SPILLWAY FEATURES

37. PRINCIPAL SPILLWAY TYPE (CIRCLE APPLICABLE) - PIPE, MONOLITHIC, OPEN CONCRETE STRUCTURE, OTHER
38. IS THERE COLD WATER RELEASE FACILITY? No
39. NUMBER OF STAGES 1 (1 or 2)
40. LOW STAGE CAPACITY -0- CFS (AT HIGH STAGE PRINCIPAL SPILLWAY CREST)
41. PRINCIPAL SPILLWAY CAPACITY 292 CFS ✓ (AT LOWEST EMERGENCY SPILLWAY CREST)

PRINCIPAL SPILLWAY CONDUIT FEATURES

42. MAJOR PORTION OF CONDUIT IS ON (CIRCLE APPLICABLE) - ROCK OR EARTH ✓
43. TYPE OF ENERGY DISSIPATOR (CIRCLE APPLICABLE) - IMPACT BASIN, SAF, PLUNGE POOL, NONE, OTHER
44. CONDUIT SIZE 3.5 ✓ (LARGEST CONDUIT THROUGH DAM) (DIAM. IN FT. IF ROUND) (HEIGHT AND WIDTH IN FT. IF MONOLITHIC) ALSO SHOW NUMBER OF BARRELS IF MULTI-BARREL
45. ~~INLET TYPE~~ (CIRCLE APPLICABLE) - CONCRETE-OPEN TOP, COVERED TOP, HOOD INLET, METAL-OPEN TOP, OTHER
46. HEIGHT OF RISER 23.2 FT. (FROM TOP OF FLOOR TO TOP OF ANTI-VORTEX)

EMERGENCY SPILLWAY FEATURES

47. PRIMARY EMERGENCY SPILLWAY TYPE (CIRCLE APPLICABLE) ~~CLOSED CONDUIT~~, OPEN CONCRETE STRUCTURE, EARTH, VEGETATED, SOFT ROCK, HARD ROCK 3/
48. PRIMARY EMERGENCY SPILLWAY WIDTH 120 FT. (CREST LENGTH FOR CONCRETE)
49. 1.4 % PERCENT CHANCE OF USE OF PRIMARY EMERGENCY SPILLWAY

1/ N. M. Fenneman, 1938, Physiography of Eastern United States, McGraw Hill Book Co., New York, N. Y.

2/ See TSC Technical Note - Engineering UD-22.

3/ Soft Rock - Rock that will erode when subjected to flowing water.
Hard Rock - Rock that is resistant to erosion due to flowing water.

CONTINUED ON REVERSE SIDE

D-24

EMERGENCY SPILLWAY FEATURES (CONT'D.)

50. 7000 CFS
CAPACITY OF PRIMARY EMERGENCY SPILLWAY (WHEN POOL IS AT TOP OF DAM)

51. 4.7 ✓ FT.
DIFFERENCE IN ELEVATION BETWEEN CREST OF PRIMARY EMERGENCY SPILLWAY AND TOP OF DAM

52. SECONDARY EMERGENCY SPILLWAY IS (CIRCLE APPLICABLE) NONE, EARTH, VEGETATED, SOFT ROCK, HARD ROCK 3/

53. WIDTH OF SECONDARY EMERGENCY SPILLWAY _____ FT.

54. CAPACITY OF SECONDARY EMERGENCY SPILLWAY (WHEN POOL IS AT TOP OF DAM) _____ CFS

55. _____ FT.
DIFFERENCE IN ELEVATION BETWEEN CREST OF SECONDARY EMERGENCY SPILLWAY AND TOP OF DAM

OMIT ITEMS 56-59 IF DRAINAGE AREA IS LESS THAN 10 SQUARE MILES

56. BULK LENGTH OF SOFT ROCK 3/ EARTH OR VEGETATED SPILLWAY (SEE TR-52 FOR DEFINITION) _____ FT.

57. _____
PI OF SURFACE MATERIAL IN EARTH OR VEGETATED SPILLWAY (PREDOMINANT MATERIAL AT OR NEAR SURFACE BEFORE TOP SOILING)

58. _____
USCS CLASSIFICATION OF ABOVE MATERIAL

59. _____ AC. FT.
VOLUME OF OUTFLOW THROUGH VEGETATED OR EARTH SPILLWAY (DURING PASSAGE OF FREEBOARD HYDROGRAPH)

COST DATA * Not Applicable

WORK PLAN

60. LAND RIGHTS COST $ _____

61. FEDERAL SHARE OF LAND RIGHTS COST $ _____

62. CONSTRUCTION COST $ _____
(DOES NOT INCLUDE LAND RIGHTS, ENGINEERING AND PROJECT ADMINISTRATION)

63. FEDERAL SHARE OF CONSTRUCTION COST IN PERCENT _____ %

COMPLETED STRUCTURE

64. FINAL CONSTRUCTION COST $ _____

MISCELLANEOUS DATA

65. Boy Scout Pond
POPULAR NAME OF DAM

66. _____
NAME OF RESERVOIR

67. NEAREST CITY OR TOWN Warrenville

68. TYPE OF DAM IF CONCRETE (CIRCLE APPLICABLE) BUTTRESS, ARCH, MULTI-ARCH

69. IS DISCHARGE THROUGH PRINCIPAL SPILLWAY CONTROLLED BY GATES? No

70. ESTIMATED COMPLETION DATE (IF UNDER CONSTRUCTION) _____

71. OWNER Eastern Conn. Council of Boy Scouts

72. ENGINEERING BY SCS

73. CONSTRUCTION BY Becker Const. Co.
(CONSTRUCTION CONTRACTOR)

74. ABOVE DATA FURNISHED BY J. Polulech
(NAME)

75. DATE DATA FURNISHED 12/22/75

76. REMARKS * Cost Data not applicable. CO-OP funding.

3/ Soft Rock - Rock that will erode when subjected to flowing water.
Hard Rock - Rock that is resistant to erosion due to flowing water.

PRELIMINARY GUIDANCE

FOR ESTIMATING

MAXIMUM PROBABLE DISCHARGES

IN

PHASE I DAM SAFETY

INVESTIGATIONS

New England Division
Corps of Engineers

March 1978

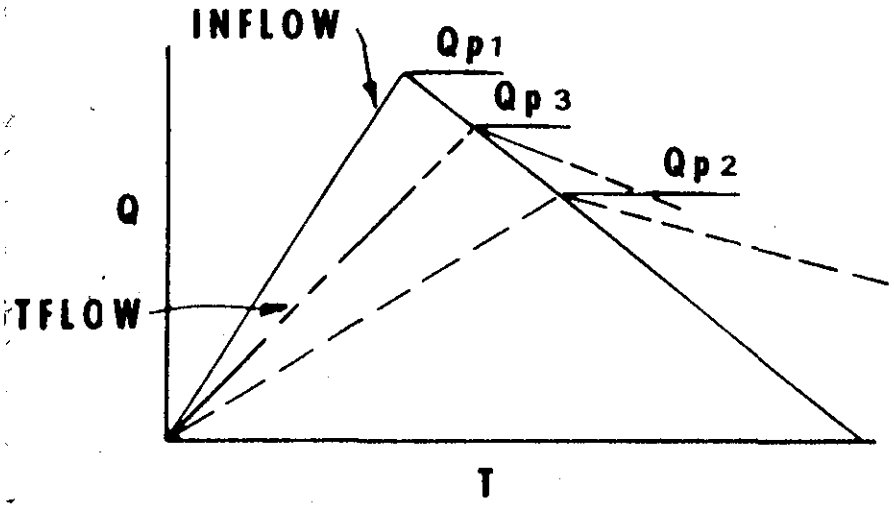
MAXIMUM PROBABLE FLOOD INFLOWS
NED RESERVOIRS

	Project	Q (cfs)	D.A. (sq. mi.)	MPF cfs/sq. mi.
1.	Hall Meadow Brook	26,600	17.2	1,546
2.	East Branch	15,500	9.25	1,675
3.	Thomaston	158,000	97.2	1,625
4.	Northfield Brook	9,000	5.7	1,580
5.	Black Rock	35,000	20.4	1,715
6.	Hancock Brook	20,700	12.0	1,725
7.	Hop Brook	26,400	16.4	1,610
8.	Tully	47,000	50.0	940
9.	Barre Falls	61,000	55.0	1,109
10.	Conant Brook	11,900	7.8	1,525
11.	Knightville	160,000	162.0	987
12.	Littleville	98,000	52.3	1,870
13.	Colebrook River	165,000	118.0	1,400
14.	Mad River	30,000	18.2	1,650
15.	Sucker Brook	6,500	3.43	1,895
16.	Union Village	110,000	126.0	873
17.	North Hartland	199,000	220.0	904
18.	North Springfield	157,000	158.0	994
19.	Ball Mountain	190,000	172.0	1,105
20.	Townshend	228,000	106.0(278 total)	820
21.	Surry Mountain	63,000	100.0	630
22.	Otter Brook	45,000	47.0	957
23.	Birch Hill	88,500	175.0	505
24.	East Brimfield	73,900	67.5	1,095
25.	Westville	38,400	99.5(32 net)	1,200
26.	West Thompson	85,000	173.5(74 net)	1,150
27.	Hodges Village	35,600	31.1	1,145
28.	Buffumville	36,500	26.5	1,377
29.	Mansfield Hollow	125,000	159.0	786
30.	West Hill	26,000	28.0	928
31.	Franklin Falls	210,000	1000.0	210
32.	Blackwater	66,500	128.0	520
33.	Hopkinton	135,000	426.0	316
34.	Everett	68,000	64.0	1,062
35.	MacDowell	36,300	44.0	825

MAXIMUM PROBABLE FLOWS BASED ON TWICE THE STANDARD PROJECT FLOOD (Flat and Coastal Areas)

	River	SPF (cfs)	D.A. (sq. mi.)	MPF (cfs/sq. mi.)
1.	Pawtuxet River	19,000	200	190
2.	Mill River (R.I.)	8,500	34	500
3.	Peters River (R.I.)	3,200	13	490
4.	Kettle Brook	8,000	30	530
5.	Sudbury River.	11,700	86	270
6.	Indian Brook (Hopk.)	1,000	5.9	340
7.	Charles River.	6,000	184	65
8.	Blackstone River.	43,000	416	200
9.	Quinebaug River	55,000	331	330

ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES



STEP 1: Determine Peak Inflow (Qp_1) from Guide Curves.

STEP 2: a. Determine Surcharge Height To Pass "Qp_1".

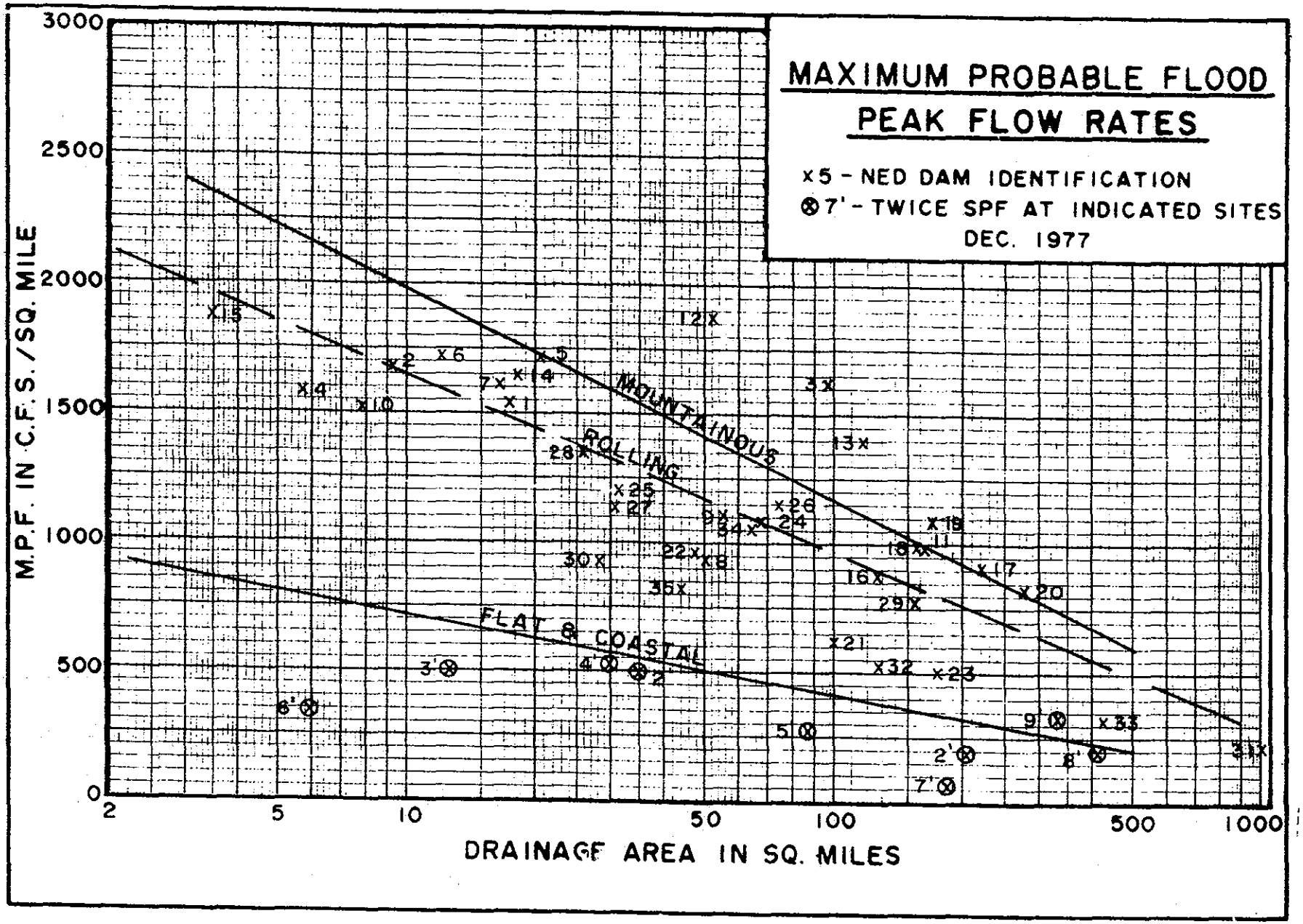
b. Determine Volume of Surcharge ($STOR_1$) In Inches of Runoff.

c. Maximum Probable Flood Runoff In New England equals Approx. 19", Therefore:

$$Qp_2 = Qp_1 \times \left(1 - \frac{STOR_1}{19}\right)$$

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

b. Average "$STOR_1$" and "$STOR_2$" and Determine Average Surcharge and Resulting Peak Outflow "Qp_3".


MAXIMUM PROBABLE FLOOD
PEAK FLOW RATES
x5 - NED DAM IDENTIFICATION
⊗7' - TWICE SPF AT INDICATED SITES
DEC. 1977
M.P.F. IN C.F.S./SQ. MILE
DRAINAGE AREA IN SQ. MILES
3000
2500
2000
1500
1000
500
0
2
5
10
50
100
500
1000
MOUNTAINOUS
ROLLING
FLAT & COASTAL
x15
x4
x10
x2
x6
x5
7x
x14
x1
12x
3x
13x
28x
x25
x27
x26
9x
34x
x24
x18
11
18x
x17
x20
16x
29x
22x
x8
30x
36x
x21
x32
x23
3'⊗
4'⊗
2
8'⊗
5⊗
9'⊗
x33
2'⊗
8'⊗
7'⊗
31x

SURCHARGE STORAGE ROUTING SUPPLEMENT

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

b. Avg "$STOR_1$" and "$STOR_2$" and Compute "Qp_3".

c. If Surcharge Height for Qp_3 and "$STOR_{AVG}$" agree O.K. If Not:

STEP 4: a. Determine Surcharge Height and "$STOR_3$" To Pass "Qp_3"

b. Avg. "Old $STOR_{AVG}$" and "$STOR_3$" and Compute "Qp_4"

c. Surcharge Height for Qp_4 and "New $STOR_{Avg}$" should Agree closely

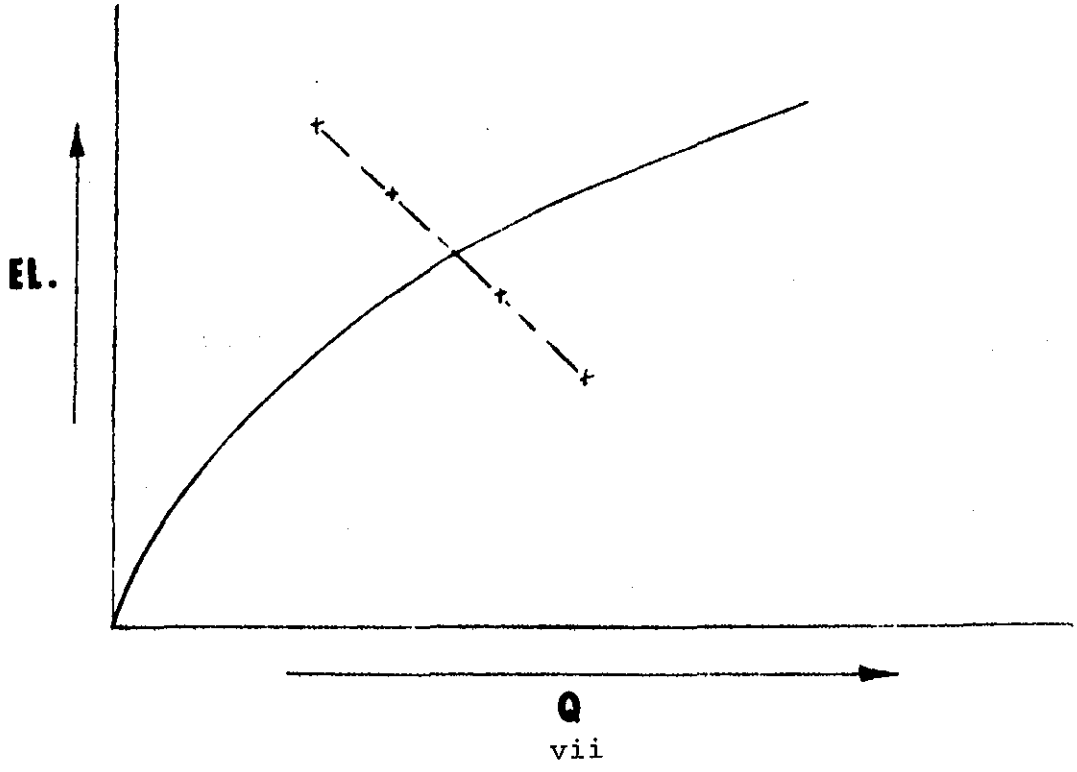
SURCHARGE STORAGE ROUTING ALTERNATE

$$Q_{p2} = Q_{p1} \times \left(1 - \frac{STOR}{19}\right)$$

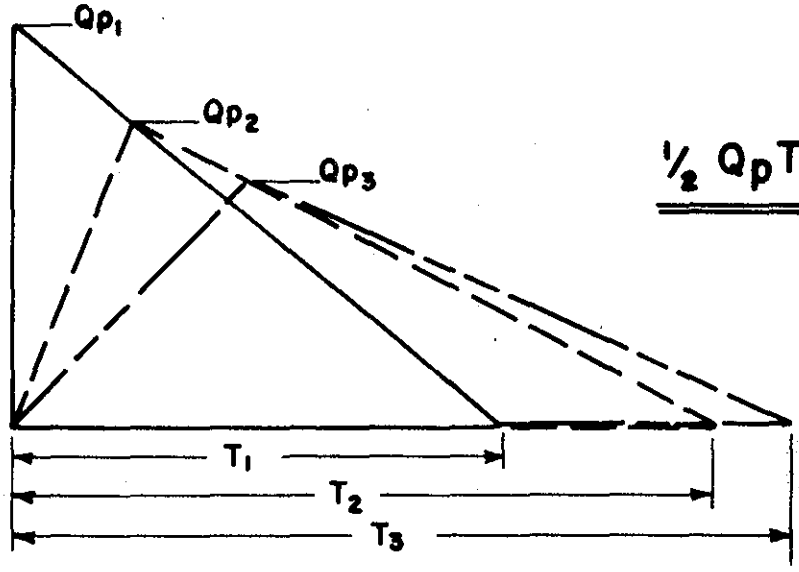
$$Q_{p2} = Q_{p1} - Q_{p1}\left(\frac{STOR}{19}\right)$$

FOR KNOWN Q_{p1} AND 19'' R.O.

Q_{p2} STOR EL.



"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



$\frac{1}{2} Q_p T = 12 S$

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW (Q_{p1}).

$$Qp_1 = \frac{8}{27} W_b \sqrt{g} Y_o^{\frac{3}{2}}$$

W_b = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

Y_o = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW (Q_{p2}) USING FOLLOWING ITERATION.

A. APPLY Q_{p1} TO STAGE RATING, DETERMINE STAGE AND ACCOPMANYING VOLUME (V_1) IN REACH IN AC-FT. (NOTE: IF V_1 EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL Q_{p2}.

$$Qp_2(\text{TRIAL}) = Qp_1 \left(1 - \frac{V_1}{S}\right)$$

C. COMPUTE V_2 USING Q_{p2} (TRIAL).

D. AVERAGE V_1 AND V_2 AND COMPUTE Q_{p2}.

$$Qp_2 = Qp_1 \left(1 - \frac{V_{AVG}}{S}\right)$$

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(9) NAME	(10) LATITUDE (NORTH)	(11) LONGITUDE (WEST)	(12) REPORT DATE DAY	MO	YR
CT	462	NED	CT	013	02				ASHFORD LAKE DAM	4153.8	7207.7	01	SEP	80

(13) POPULAR NAME	(14) NAME OF IMPOUNDMENT
	ASHFORD LAKE

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY--TOWN--VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	10	GOSS BROOK	WARRENVILLE	3	250

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	(27) NORMAL (ACRE-FT.)
REPG	1949	R	27	27	715	325

DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
NED	N	N	N	N	

(28) REMARKS

(29) D/S HAS	(30) SPILLWAY CREST LENGTH	(31) TYPE	(32) WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT.)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) PROPOSED (MW)	(37) NO.	(38) LENGTH (FT.)	(39) WIDTH (FT.)	(40) LENGTH (FT.)	(41) WIDTH (FT.)	(42) LENGTH (FT.)	(43) WIDTH (FT.)	(44) LENGTH (FT.)	(45) WIDTH (FT.)
1	450	U	15	650												

(46) OWNER	(47) ENGINEERING BY	(48) CONSTRUCTION BY
ASHFORD LAKE INC		

(49) REGULATORY AGENCY			
(50) DESIGN	(51) CONSTRUCTION	(52) OPERATION	(53) MAINTENANCE
CT ENVIRON PROTECT	CT ENVIRON PROTECT	CT ENVIRON PROTECT	CT ENVIRON PROTECT

(54) INSPECTION BY	(55) INSPECTION DATE DAY	MO	YR	(56) AUTHORITY FOR INSPECTION
CAMP ENGINEERS INC	31	MAR	80	PL92-367

(57) REMARKS
--HAROLD GARRITY-GARRITY,WALSH,DIANA,WICHMAN ATTORNEYS